Market Intelligence
& Analytics

CRISIL
An S&P Global Company

# Market review of Indian Iron & Steel sector

## A-One Steels India Private Limited

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Research

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# 1. Indian economy review and outlook

## 1.1 Global economic growth

### 1.1.1 Monetary stance begins to ease as inflation moderates; growth holds steady

Global economic growth remains steady, but moderate, with emerging economies growing faster than developed ones. The United States of America (US) seems to be outperforming other advanced economies in calendar year (CY) 2024, while India remains one of the fastest growing among emerging economies.

The International Monetary Fund (IMF) estimates that global GDP will grow 3.2% each year in 2024 and 2025. Growth is expected to be divergent, with advanced economies experiencing slightly modest growth and emerging economies logging steady growth through the two years.

India is expected to emerge relatively stronger amid the global uncertainties, logging 8.2% GDP growth in Fiscal 2024 and 6.8% in Fiscal 2025. References to "Fiscal" or "FY" herein are to the year ended/ending on March 31 of the identified year.

**Table 1: Real GDP growth**

| YoY (%) | CY18 | CY19 | CY20 | CY21 | CY22 | CY23 | CY24P | CY25P |
|---|---|---|---|---|---|---|---|---|
| World | 3.6 | 2.9 | -3.1 | 6.0 | 3.5 | 3.3 | 3.2 | 3.3 |
| Advanced economies | 2.3 | 1.7 | -4.5 | 5.2 | 2.6 | 1.7 | 1.8 | 1.8 |
| - Euro area | 1.8 | 1.6 | -6.1 | 5.2 | 3.4 | 0.5 | 0.8 | 1.2 |
| - US | 2.9 | 2.3 | -3.4 | 5.7 | 1.9 | 2.5 | 2.8 | 2.2 |
| - UK | 1.7 | 1.7 | -9.3 | 7.4 | 4.3 | 0.1 | 1.1 | 1.5 |
| - Germany | 1.1 | 1.05 | -4.6 | 2.6 | 1.8 | -0.2 | 0.0 | 0.8 |
| - Japan | 0.6 | -0.2 | -4.5 | 1.7 | 1.0 | 1.9 | 0.3 | 1.1 |
| Emerging and developing economies | 4.6 | 3.7 | -2.0 | 6.6 | 4.1 | 4.4 | 4.2 | 4.2 |
| - China | 6.7 | 6.0 | 2.2 | 8.1 | 3.0 | 5.2 | 4.8 | 4.5 |
| - India*^ | 6.5 | 3.9 | -5.8 | 9.7 | 7.0 | 8.2 | 6.8 | 6 to 7 % |

**India numbers are on a Fiscal-year basis, where CY18 would correspond to Fiscal 2019*

*^CRISIL MI&A Research projections for CY24; IMF projections for CY25*

*E – estimated; P – projected; NA – not available*

*Source: IMF World Economic Outlook, October 2024*

### 1.1.2 Easing monetary cycles expected in the medium term

Globally, inflation has been falling since mid-2022, supported by lower fuel and energy prices, especially in the US, euro area and Latin America.

**Table 2: Inflation movement across key economies**

| YoY (%) | CY18 | CY19 | CY20 | CY21 | CY22 | CY23 | CY24P^ | CY25P^ |
|---|---|---|---|---|---|---|---|---|
| Advanced economies | | | | | | | | |
| - Euro area | 1.8 | 1.2 | 0.3 | 2.6 | 8.4 | 5.4 | 2.4 | 2.2 |
| - US | 2.4 | 1.8 | 1.2 | 4.7 | 8.0 | 4.1 | 3.0 | 2.0 |
| - UK | 2.5 | 1.8 | 0.9 | 2.6 | 9.1 | 7.3 | 2.8 | 2.4 |
| - Germany | 1.9 | 1.4 | 0.4 | 3.2 | 8.7 | 6.0 | 2.7 | 2.3 |
| - Japan | 1.0 | 0.5 | 0.0 | -0.2 | 2.5 | 3.3 | 2.4 | 2.2 |
| Emerging and developing economies | | | | | | | | |
| - China | 2.1 | 2.9 | 2.5 | 0.9 | 2.0 | 0.2 | 0.5 | 1.5 |
| - India | 3.4 | 4.8 | 6.2 | 5.5 | 6.7 | 5.4 | 4.6 | 4.6 |

*Notes:*

*E – estimated; P – projected*

*^Projections for CY24 and CY25 are based on S&P Global forecasts*

*Source: IMF World Outlook, July and October 2024; S&P Global June 2024 regional releases*

Inflation has started easing due to the steps as food inflation is expected to be lower in Fiscal 2025 compared with the last, owing to healthy kharif sowing. Non-food inflation is expected to remain benign. Overall, the consumer price inflation (CPI) to expected to soften to 4.6% in Fiscal 2025, from 5.4% last Fiscal.

These factors have now triggered the much-awaited policy-rate-cut cycle after a long period of waiting by central banks for the moderation of stubborn inflation. Bank of Canada and the European Central Bank lowered rates by 25 basis points (bps) in June 2024. The US Federal Reserve also cut rates by 50 bps in its September 2024 meeting, indicating an easing of monetary policy. This relationship between demand, inflation and rate cuts is now expected to be the dominant narrative in the medium term.

## 1.2 Indian macroeconomic view

### 1.2.1 GDP review and outlook

India is the 5th largest economy in the world. It logged a strong 7.8% on-year growth in the fourth quarter of Fiscal 2024, compared with 5.9% pencilled-in by the National Statistical Office (NSO) in its second advance estimates in February 2024. With this, real GDP growth printed at 8.2% on-year for Fiscal 2024, higher than the 7.0% in the previous Fiscal, driven by fixed investments on the demand side and industry on the supply side.

In Fiscal 2025, GDP grew 6.7% on-year in the first quarter, aided by a significant pickup in private consumption in contrast to Fiscal 2024, but limited by slower government spending and slower manufacturing. The momentum slowed in second quarter of Fiscal 2025 with 5.4% growth on-year owing to sluggish urban demand.

Following a strong GDP print over Fiscals 2022 to 2024E, GDP growth is expected to moderate to 6.8% in Fiscal 2025 as Fiscal consolidation will reduce the Fiscal impulse to growth, credit conditions can tighten this year moderating urban demand, and slower global growth can restrict the upside to goods exports due to the normalisation of supply chains and an expected pickup in trade volume in calendar year 2024. Nevertheless, this would still mean India will log the fastest growth among major economies and fare better than the 6.7% growth seen in the decade preceding the pandemic.

**Figure 1: Historical GDP growth and outlook**


*P – projected*

*Source: Ministry of Statistics and Programme Implementation ("MoSPI"), CRISIL MI&A Research*

In the medium term, the Indian economy is projected to grow 6-7% on-year, boosted by healthy public capital expenditure (capex), domestic-consumption-led growth, the ongoing supply-chain de-risking strategy of global companies that should boost manufacturing in India and the thrust provided by the PLI scheme. However, the slowdown in global economies could negatively impact Indian exports, limiting GDP growth to some extent.

**Table 3: India's GDP and macroeconomic outlook**

| Macro variable | FY22 | FY23 | FY24 | FY25P | Rationale for outlook |
|---|---|---|---|---|---|
| Real GDP (%, y-o-y) | 9.1 | 7.2 | 8.2 | 6.8 | High interest rates and lower Fiscal impulse (from reduction in the Fiscal deficit) are expected to weigh on growth. But growth will become more balanced as the last year's laggards — agriculture and private consumption — are poised to rise. High rural demand and easing food inflation are expected to lift consumption. |
| Consumer price Index (CPI) inflation (%, y-o-y) | 5.5 | 6.7 | 5.4 | 4.6 | In our base case, we expect food inflation to be lower this Fiscal compared with the last, as kharif sowing has been healthy. Non-food inflation is expected to remain benign. Overall, we expect the consumer price inflation (CPI) to soften to 4.6% in Fiscal 2025, from 5.4% last Fiscal. |
| Current account balance/GDP (%) | 1.2 | 2.0 | 0.7 | 1.0 | Higher imports given the uptick in consumption demand this Fiscal is expected to widen the trade deficit and put some pressure on the current account deficit. That said, healthy services trade surplus and remittances should keep a tab on the current account deficit. |
| ₹/US$ (March end) | 76.2 | 82.3 | 83.0 | 84.0 | Although the current account deficit is expected to remain manageable, it may face some risks amid the uneven global growth scenario and geopolitical uncertainties. That said, India's healthy domestic macros should cushion the Indian Rupee. |

*P: Projected*

*Source: RBI, NSO, CRISIL MI&A Research*

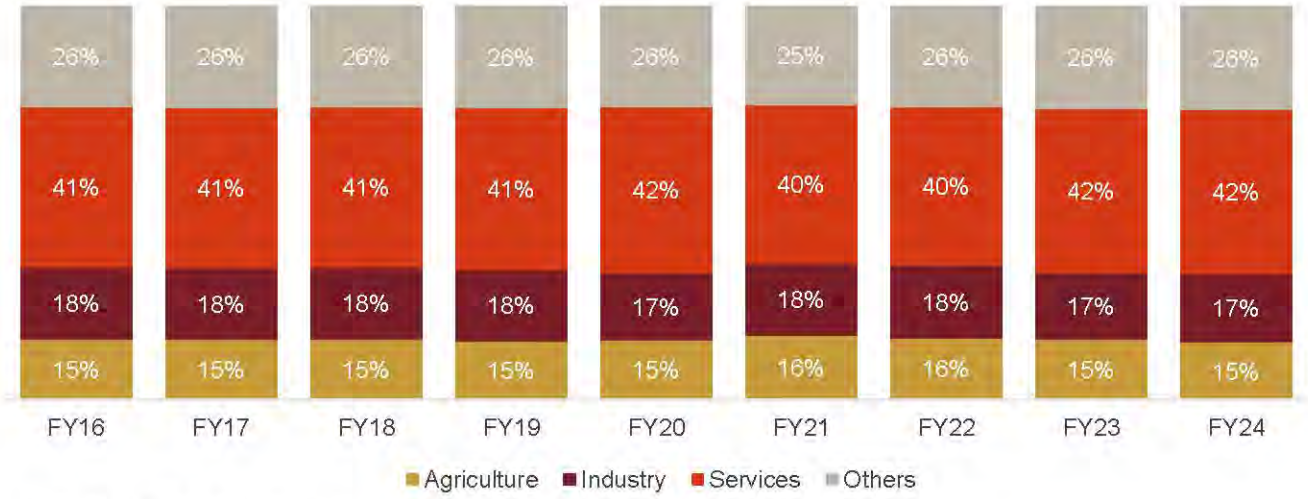
## 1.3 Contribution of key sectors to gross value added

India's gross value added (GVA) has consistently grown over the years, except in Fiscal 2021 due to the pandemic. The services sector remains a significant contributor to GVA, with services exports growing faster than the economy. The manufacturing sector has grown at a 3% CAGR between Fiscals 2017 and 2022, driven by central government (Government) initiatives like Atmanirbhar Bharat, Make in India, and the PLI scheme. Although the industry's share in GVA remains constant, pending PLI investments are expected to boost growth. Agriculture GVA has grown at a 3% CAGR, driven by government support to farmers, including subsidies, infrastructure development, and schemes like PM Kisan and PM Fasal Bima Yojana.

The Government has increased its budget allocation for agriculture and farmers' welfare from ₹276.6 billion in Fiscal 2014 to ₹1,250.3 billion in Fiscal 2024.

Normal monsoons, government schemes, and favourable agricultural prices have aided growth, but erratic monsoon patterns remain a concern, driving demand for reliable irrigation solutions like solar pumps.

**Figure 2: Contribution of key sectors (industry, agriculture and services) to GVA**




*Source: MoSPI, CRISIL MI&A Research*

### 1.3.1 Multi-pronged policy focus helps prop up rural segment

The rural economy has benefitted from two consecutive years of good monsoon and increased spending under the Mahatma Gandhi National Rural Employment Guarantee Act, irrigation programmes and schemes such as Direct Benefit Transfer, PM Kisan, PM KUSUM, PM Ujjwala Yojana for cooking gas, PM Awas Yojana for housing and Ayushman Bharat Yojana for healthcare. To supplement this, there has been a continuous improvement in electricity and road infrastructure in rural areas. In addition, the Reserve Bank of India mandates priority sector lending to specific sectors, such as agriculture and allied activities, education, housing and food for the poorer population. Out of the overall target of 75% of total outstanding towards priority sector lending by regional rural banks, the agriculture sector is allotted 18%. The lending is categorised as (i) farm credit (short-term crop loans and medium/long-term credit to farmers) (ii) agriculture infrastructure and (iii) ancillary activities. Such initiatives have led to reduced leakages and higher incomes for the rural populace, thereby enhancing their ability and willingness to spend on discretionary products and services. To boost agriculture growth and developing the product dynamics in the country, the government also established Agriculture infrastructure fund of ₹ 1 trillion at farm-gate and aggregation points aimed at making the sector affordable and financially viable. The rural economy

accounts for almost half of India's gross domestic product and has recorded a better performance in last decade, compared with its urban counterpart in the aftermath of the pandemic.

There are three reasons for this. First, agricultural activity has continued largely unhindered, with normal monsoon and lower spread of the pandemic in rural areas, given lower population density. Second, the government offered support, making available an additional Indian Rupees (₹ or Rs.) 500 billion of funding towards MGNREGA as well as disbursing over ₹2.6 trillion towards the PM Kisan scheme till July 2023. Third, the structure of the non-agricultural rural economy has helped it bear the COVID-induced shock better. The rural economy accounts for 51% of India's manufacturing GDP, but the rural share in services GDP (excluding public administration, defence, and utilities) is much lower, at ~26%.

### 1.3.2 Private investment and rural consumption growth key for fiscal 2025

On average, IIP growth was lower in the second half of fiscal 2024 (5.7% between October 2023 and March 2024) compared with 6.3% in the first half. This was consistent with the NSO's provisional estimates for fiscal 2024 that pegged GVA growth at ~6.5% in the second half compared with 8.0% in the first half.

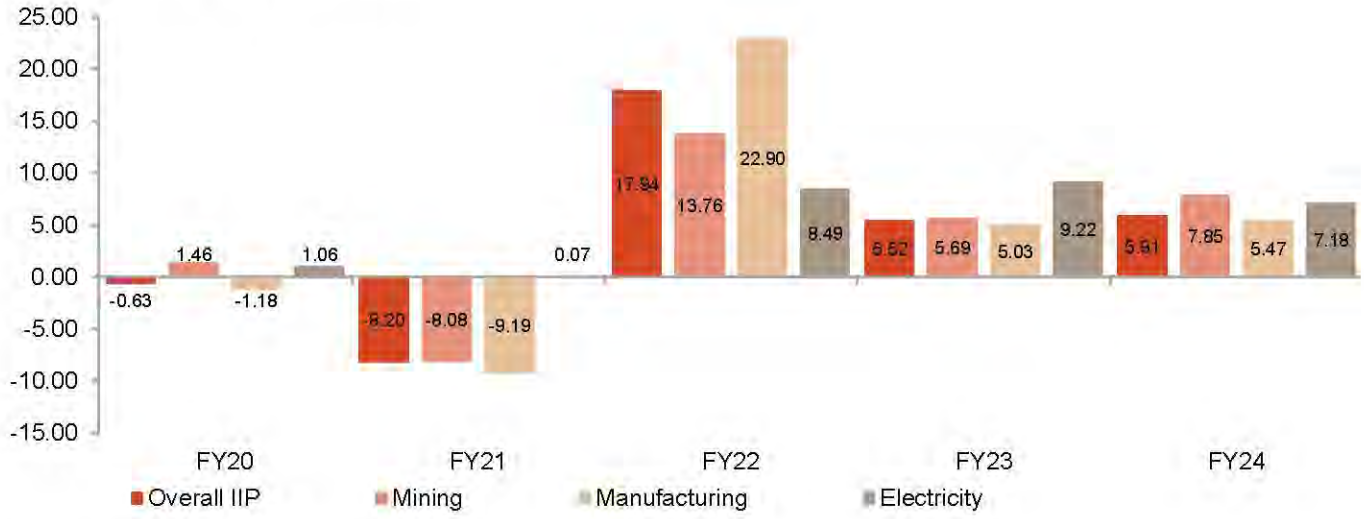
Weak growth in consumer non-durables has driven the fall in IIP growth in the second half of fiscal 2024, possibly reflecting weak consumption at the bottom income segment of the population, particularly in rural areas. In fiscal 2025 as well, industrial growth hinges on consumption revival. Rural demand that had slipped last fiscal, awaits better agricultural growth. While the monsoon has been above normal with promising agricultural prospects.

Further, private consumption has been the weak link, estimated to grow just 4.0% in fiscal 2024, much below the 8.2% GDP growth. We expect government support to weaken further in the current fiscal as it pursues the path to fiscal consolidation. But a pick-up in private capex is critical to sustaining the investment momentum.

Growth in India's major trading partners is expected to be uneven in CY2024 as well, with the EU expected to post tepid growth, though the US will retain its momentum. Overall, global trade flows could revive on a low base of the previous year, but geopolitical uncertainty in the Middle East remains a risk, restricting a broad-based recovery in exports.

The fiscal started on a good note, with merchandise exports logging steady growth in the first quarter. This along with key multilateral organisations' forecasts of better on-year trade growth are encouraging. The government's increased focus on foreign trade agreements should also provide a thrust. The expected moderation in domestic growth should keep a tab on growth in imports and, thereby on trade deficit. At the same time, the surplus in services trade and robust remittances flow suggests the current account will provide a cushion to the current account balance.

**Figure 3: IIP on-year growth trend**




*Source: MoSPI, CEIC, CRISIL MI&A Research*

**Policy rate unchanged in fiscal 2025**

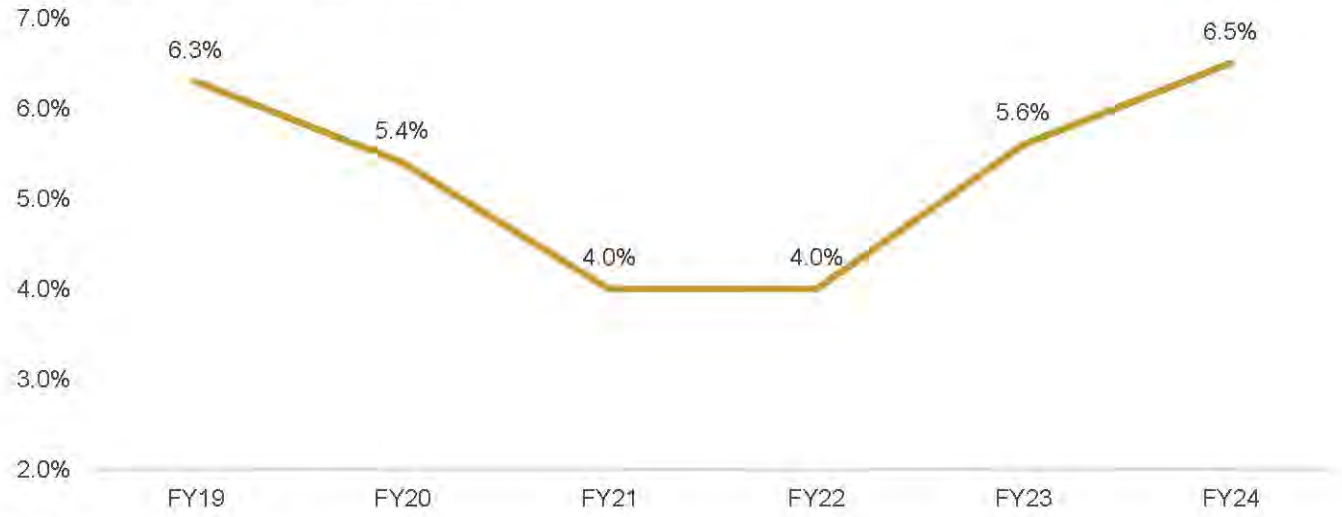
The RBI's Monetary Policy Committee (MPC) held policy rates steady through fiscal 2024. However, slowing inflation, a smaller fiscal deficit and an imminent turn in the US Federal Reserve's policy rates will lay the ground for the MPC to start cutting rates by February 2025.

That said, while consumer price inflation has remained within the RBI's tolerance band of 2-6% since August 2023, the transmission of past rate hikes, liquidity tightening and recent regulatory actions by the RBI are expected to curb bank and non-banking credit growth, which could moderate domestic demand in fiscal 2025, especially in the urban areas.

And as the government pursues fiscal consolidation, there are expected policy rate cuts by the RBI and robust foreign capital inflows, the 10-year Government Security (G-sec) yield is also expected to soften from March 2024 levels. CRISIL MI&A Research expects the yield to average 6.8% by March 2025 compared with 7.1% in March 2024.

Other than lower gross borrowings, policy rate cuts by the MPC, lower domestic inflation will pull down yields. India's inclusion in the JP Morgan Emerging Market Bond Index from mid-2024 will contribute to the drop in yields. In fact, announcement of the inclusion has already led to a surge in foreign inflows in the Indian debt market to their highest level since 2017.

**Figure 4: Annual trend of repo rate**




*Source: Reserve Bank of India*

In December 2024, the MPC voted 4-2 to keep the policy rates unchanged. The repo rate was kept unchanged at 6.50%, the standing deposit facility at 6.25% and the marginal standing facility at 6.75% for the 21st month in a row. The stance was unanimously retained at 'neutral'.

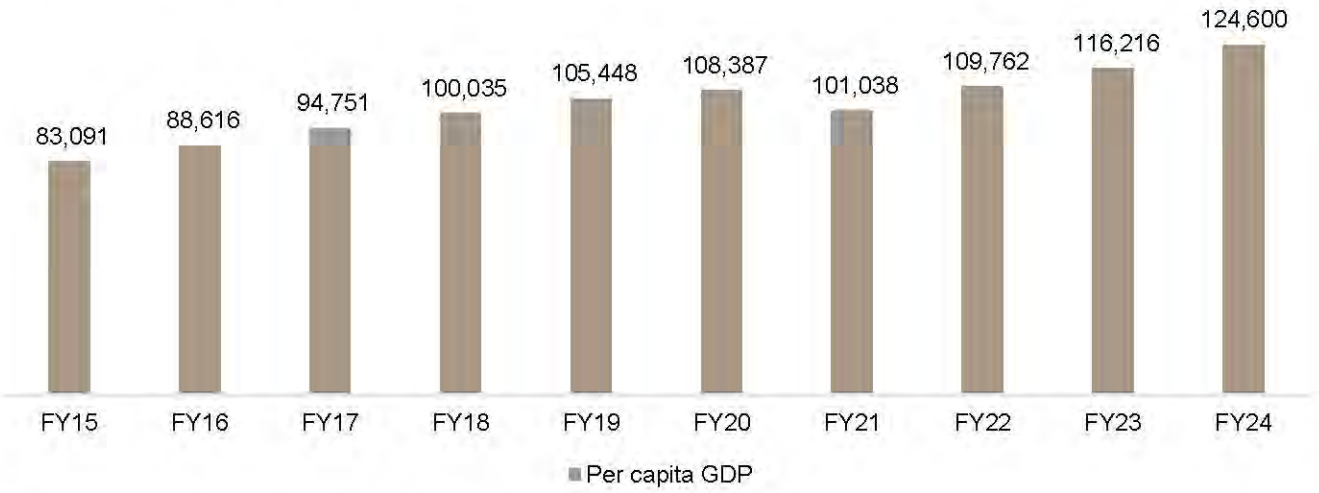
While policy rates were unchanged, the RBI cut the cash reserve ratio (CRR) to support liquidity in the financial system. The RBI will cut the CRR in two tranches of 25 bps in December, bringing it to 4% this fiscal, on a par with pre-pandemic rates. These cuts are expected to swiftly boost systemic liquidity, which is seeing signs of pressure, and keep financial conditions conducive for growth.

Sticky food inflation kept RBI from cutting rates. The MPC expects headline Consumer Price Index-based (CPI) inflation to remain elevated till the third quarter of the current fiscal, driven by high food prices. That said, winter crop arrivals are expected to ease food inflation in the fourth quarter. A healthy monsoon has improved kharif production this year and augurs well for rabi production. Pressures from global prices, particularly for edible oils, need monitoring. The MPC noted the projected rise in manufacturing and services firms' selling prices for the fourth quarter could push up non-food inflation. These factors persuaded the MPC to increase its CPI inflation forecast by 30 bps to 4.8% for fiscal 2025.

## 1.4 GDP per capita trends

India's GDP per capita in real terms logged CAGR of 5.46% between Fiscals 2015 and 2020, rising from ~₹ 83,000 to ~₹108,000. Over the last 3 fiscals, i.e. fiscal 22, fiscal 23, and fiscal 24, GDP per capita has increased by ~8.6%, ~5.9% and ~7.2%, respectively.

**Figure 3: India's GDP per capita (₹)**




Note: Data is based on constant prices, 2011-12 base; Fiscal 2024 data is provisional
*Source: National Accounts Statistics, CRISIL MI&A Research*

Crop cycles, pricing and production are major factors towards influencing farmer incomes and hence largely rural growth. For instance, farmer income would be largely impacted by the monsoon quality, the crop chosen for sewing and the market pricing policy for the crop.

Consequently, to mitigate the volatility related to agricultural income, the government through various schemes has tried to improve income levels for this segment of the economy. Some of them are:

- Direct financial assistance to 118 million farmers under the PM Kisan scheme, crop insurance to 40 million farmers under the PM Fasal Bima Yojana scheme.
- PM-KUSUM (Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan) Scheme is aimed at ensuring energy security for farmers in India, along with increasing the renewable energy share in India.
- Introduced PM Surya Ghar Muft Bijli Yojana. Under this scheme, the government aims to make 10 million households self-sufficient in generating up to 300 units of electricity per month.
- The PM Kisan Sampada Yojana scheme has benefited 3.8 million farmers and generated 1 million employments. The PM Formalization of Micro Food Processing Enterprises Yojana scheme has assisted 0.24 million self-help groups and 0.06 million individuals with credit linkages.

# 2. Manufacturing process for iron and steel

## 2.1 Process overview

Steel is prepared from iron through a process that involves multiple stages.

The process begins with extracting and refining iron ore, the primary raw material. If the ore grade is not suitable for iron making, beneficiation is employed to increase its iron content and remove impurities. If iron ore fines are not suitable for direct usage due to their size or composition, agglomeration techniques are used. Iron ore fines can be agglomerated into larger, more uniform particles through processes such as pelletisation or sintering. Pelletisation involves forming iron ore fines into small spherical pellets using binders and additives, while sintering involves heating the fines to agglomerate them into larger particles with the help of fluxes and coke breeze.

After raw material preparation, auxiliary materials such as limestone, coke and recycled steel scrap are incorporated to aid the process. Iron ore undergoes further processing in a blast furnace or through direct reduction to produce molten iron. In the blast furnace, iron ore, coke and limestone are charged, and intense heat from burning coke reduces the ore to molten iron. In direct reduction, iron ore is reduced directly in a furnace without melting, producing direct reduced iron (DRI), also known as sponge iron.

The molten iron or DRI obtained from either method serves as the foundation for steelmaking and is transferred to steelmaking vessels such as basic oxygen furnaces (BOF), electric arc furnaces (EAF) induction furnaces (IF). In the BOF process, oxygen is blown into the molten iron to oxidise impurities and reduce carbon content, while in the EAF process, electric arcs melt scrap steel and/or sponge iron. Alloying elements and fluxes are added during steelmaking to achieve the desired composition and properties of steel.

Then molten steel undergoes refining processes to further adjust its composition and remove impurities. Techniques such as degassing, desulphurisation and vacuum treatment are employed to enhance its quality. Refined steel is then cast into semi-finished products such as slabs, blooms, or billets using continuous casting or ingot casting methods.

After casting, semi-finished steel products undergo finishing operations to achieve final shapes, dimensions and finish. These operations may include hot rolling, cold rolling, forging and heat treatment. Quality control measures are implemented to ensure finished steel products meet the required specifications and standards.

Finally, finished steel products may be further treated, coated, painted, or plated before being delivered to customers.

## 2.2 Ironmaking process

**Blast furnace**

Ironmaking through a blast furnace is a foundational process in the steel industry and essential for the production of molten iron used for manufacturing a wide range of steel products. The operation of a blast furnace is a continuous process to efficiently convert raw materials into molten iron and slag.

The molten iron, being denser, sinks to the bottom of the furnace and is periodically tapped off through openings known as tapholes. Similarly, the lighter slag floats on top of the molten iron and is also tapped off for further processing.

Blast furnace ironmaking remains a dominant method globally due to its cost-effectiveness, scalability and ability to utilise a wide range of raw materials. However, it is not without environmental challenges. The combustion of coke in the blast furnace generates significant emissions of carbon dioxide ($CO_2$). Efforts to mitigate the environmental impact of blast furnace operations include the development and implementation of technologies such as carbon capture and utilisation (CCU) and ongoing research on the use of alternative reducing agents and renewable energy sources to reduce the carbon footprint of ironmaking processes.

**Direct reduced iron**

Also known as sponge iron, DRI has emerged as a key alternative feedstock for steelmaking, offering several advantages such as lower energy consumption, reduced environmental impact in some cases and greater flexibility in raw material sourcing. This report provides an overview of the DRI-based steelmaking process, detailing its operation, advantages and applications in the steel industry.

**Gas-based DRI production**

DRI is produced through the direct reduction of iron ore using reducing gases such as natural gas or syngas derived from coal or biomass. The process can occur in a shaft furnace (Midrex process) or a fluidised bed reactor with iron ore pellets and reducing gas fed into the reactor. It generates lower carbon emissions and improves process efficiency compared with coal-based methods but may be influenced by fluctuations in gas prices and availability of gas.

**Coal-based DRI production**

It involves direct reduction of iron ore using coal or coke as the primary reducing agent. The process typically occurs in an inclined kiln, where iron ore pellets and coal are fed from the top and reducing gases are generated in the lower section of the kiln. While coal-based DRI production is well-suited for regions with abundant coal resources, it may face challenges related to environmental regulations and carbon emissions.

DRI serves as a versatile feedstock for steelmaking in EAF, IF and BOF processes. In EAF, DRI is melted along with scrap steel using electric arcs generated between electrodes and the metal charge. In BOF, DRI is charged into the furnace, along with molten iron from blast furnaces or other sources, reducing the need for coke and lowering carbon emissions.

India's journey towards adopting DRI technology began in the 1970s when the first coal-based DRI plant was commissioned in the country. Initially, the focus was on utilising indigenous coal resources to produce sponge iron, thereby reducing the dependence on imported steelmaking raw materials. Today, coal-based DRI production continues to play a significant role in India's steel industry, with the country being one of the world's leading producers of sponge iron.

## 2.3 Steelmaking

**Basic Oxygen Furnace- BOF**

Also known as the oxygen converter, BOF is one of the most pivotal innovations in steelmaking and has revolutionised the industry since its introduction in the mid-20$^{th}$ century. Its development was a response to the limitations of the Bessemer process, which relied on air blown through molten iron to remove impurities but struggled with phosphorus removal and steel quality control. BOF addressed these challenges by introducing pure oxygen into the process, enabling higher temperatures and more efficient removal of impurities.

One of the key advantages of the BOF process is its versatility in steelmaking, allowing for the production of a wide range of steel grades with precise control over composition and properties. This versatility has made BOF the preferred method for producing high-quality steel used in automotive, construction and infrastructure applications. Additionally, the BOF process is highly efficient, with production cycles typically lasting less than an hour and requiring minimal energy inputs compared with other steelmaking methods.

Despite its numerous advantages, the BOF process is not without challenges. One notable drawback is its reliance on large-scale infrastructure, including blast furnaces for pig iron production and oxygen plants for supplying pure oxygen. Additionally, the BOF process generates significant emissions of $CO_2$ from the combustion of carbon in the molten iron, contributing to climate change concerns.

**Electric Arc Furnace- EAF**

This process offers versatility, efficiency and environmental benefits. After originating in the late 19$^{th}$ century, the EAF process has evolved into a highly efficient method for melting and refining scrap steel into high-quality products, making it a critical component of the steel industry's sustainability efforts.

Operationally, EAF comprises a large refractory-lined vessel equipped with graphite electrodes. Scrap steel, alongside necessary alloying agents and fluxes, is charged into the furnace, where electric arcs are generated between the electrodes and the metal charge. These arcs produce intense heat, melting the scrap steel and enabling the removal of impurities through oxidation and slag formation. This process enables precise control over steelmaking parameters, facilitating the production of a wide range of steel grades tailored to specific customer requirements.

**Induction furnace- IF**

The induction furnace operates on the principle of electromagnetic induction, where electrical energy is converted into heat within a conductive material through electromagnetic fields. The furnace consists of a refractory-lined vessel containing a crucible, where the metal charge is placed. Alternating current (AC) is passed through copper coils surrounding the crucible, generating an electromagnetic field that induces electrical currents and heat within the metal charge. This rapid and efficient heating process melts the metal charge, allowing for precise temperature control and alloying.

Induction furnace technology offers several advantages over traditional steelmaking methods. First, it provides rapid and efficient heating, resulting in shorter melting times and higher productivity. Additionally, induction furnaces are highly flexible and can accommodate a wide range of steel scrap and alloying materials, making them suitable for producing various steel grades.

Induction furnaces find application in both primary steelmaking, where they are used to melt steel scrap and produce molten metal, and secondary steelmaking, where they are employed for refining and alloying processes. They are especially well-suited for the production of specialty steels and alloys requiring precise composition control and low levels of impurities. Induction furnaces are widely used in foundries, mini mills and specialised steel production facilities, contributing to the production of high-quality steel products for various industries.

**Secondary refining**

Also known as ladle metallurgy or secondary steelmaking, secondary refining plays a vital role in enhancing the quality, purity and properties of steel after its initial production in primary steelmaking processes such as BOF or EAF. It involves a series of refining operations performed in ladles or other vessels outside the primary steelmaking furnace, enabling precise control over composition, temperature and impurity levels.

One of the primary objectives of secondary refining is to adjust the chemical composition of steel to meet specific customer requirements or industry standards. This may involve the addition of alloying elements such as chromium, nickel, manganese, or molybdenum to enhance strength, corrosion resistance, or other mechanical properties. Additionally, secondary refining enables the removal of undesirable elements such as sulphur, phosphorus and nitrogen, which can degrade the steel's performance or cause brittleness and other defects.

**Ferro alloys**

Ferro alloys are essential materials used in the steelmaking and foundry industries to enhance the properties of steel and other alloys. They serve as deoxidizers, desulfurizers, and alloying agents, playing a crucial role in refining and strengthening the final product. By introducing elements such as manganese, silicon, and chromium, ferro alloys improve steel's durability, tensile strength, and resistance to corrosion and oxidation, making them indispensable in various industrial applications.

Ferro Manganese: Ferro manganese is used primarily to remove oxygen and sulphur in steelmaking and improve the hardness and strength of steel.

Ferro Chrome: Ferro chrome enhances the corrosion and oxidation resistance of steel, making it vital for stainless steel production.

Ferro Silicon: Ferro silicon acts as a deoxidizer in steelmaking, aiding in the removal of impurities and adding strength to the steel.

Silico Manganese: Silico manganese combines the properties of both manganese and silicon, providing high strength and hardness to steel and cast iron.

**Alloyed and non-alloyed steel**

These are two fundamental categories within the broader spectrum of steel materials, each possessing distinct properties, applications and manufacturing processes.

Non-alloyed steel, often referred to as carbon steel, is primarily composed of iron and carbon, with trace amounts of other elements. Carbon steel is known for its strength, hardness, and affordability, making it suitable for a wide range of applications, including structural components, machinery parts and automotive components. Its versatility and ease of fabrication have contributed to its widespread use across various industries.

In contrast, alloyed steels contain additional alloying elements beyond carbon, such as chromium, nickel, manganese, and molybdenum, among others. These alloying elements are added to modify steel's properties, such as strength, hardness, corrosion resistance and heat resistance, to meet specific application requirements. Alloyed steels can be further categorised into several subtypes based on their composition and intended use, including stainless steel, tool steel, and high-strength low-alloy (HSLA) steel.

Stainless steel, for example, is alloyed with chromium and often nickel to enhance corrosion resistance and provide a lustrous appearance. It is commonly used in applications requiring resistance to corrosion, such as kitchen utensils, cutlery, and medical instruments. Tool steel, on the other hand, is alloyed with elements, such as tungsten, vanadium and cobalt, to improve wear resistance, toughness and heat resistance, making it suitable for cutting, drilling and forming tools. HSLA steel is alloyed with elements, such as niobium, titanium and copper, to enhance strength and toughness while maintaining weldability and formability, making it ideal for structural and automotive applications.

**Semi-finished steel**

Semi-finished steel products, including slabs, blooms, and billets, serve as intermediate forms in the steel production process, undergoing further processing and shaping before reaching their final form as finished steel products. These semi-finished products are crucial components of the steel supply chain, providing versatility, efficiency, and flexibility in meeting the diverse demands of various industries and applications.

Slabs are one of the primary semi-finished steel products, typically produced through continuous casting processes in steelmaking facilities. They are rectangular in shape and serve as the starting material for the production of flat steel products such as plates, sheets, and strips. They are characterised by their large size and uniform thickness, making them ideal for subsequent rolling and forming processes.

Blooms are another essential form of semi-finished steel products, typically produced through continuous casting or ingot casting processes. They are characterised by their square or rectangular cross-section and relatively large size compared with other semi-finished products. They serve as feedstock for production of long steel products such as bars, rods and structural shapes. Blooms are often further processed through hot rolling or forging operations to achieve the desired size, shape and mechanical properties required for specific applications.

Billets represent a smaller form of semi-finished steel products compared with slabs and blooms, typically produced through continuous casting or ingot casting processes. They are characterised by their round or square cross-section and relatively smaller size, making them suitable for further processing into wires, rods, bars and other long steel products.

## 2.4 Finished steel products

Flat and long steel products are essential components of the global steel industry, serving diverse applications across various sectors, including construction, automotive, manufacturing, infrastructure and engineering. These products are manufactured through a series of processes, including rolling and finishing, resulting in a wide range of shapes, sizes and specifications tailored to meet specific customer requirements.

**Flat steel**

Flat steel products are characterised by their flat and thin shape, making them ideal for applications requiring strength, durability and surface quality. One of the major flat steel products is hot-rolled coils (HRCs), which are produced by hot rolling steel slabs or billets at high temperatures, followed by rapid cooling. HRCs are widely used in structural applications such as buildings, bridges and pipelines, as well as in the manufacturing sector for machinery parts, automotive components and appliances.

Another important flat steel product category is cold-rolled coils (CRCs), which are produced by cold-rolling HRCs to achieve smoother surface finish, tighter dimensional tolerances and improved mechanical properties. CRCs are commonly used in applications requiring superior surface quality and dimensional accuracy, such as automotive body panels, electrical enclosures and consumer goods.

Hot-dip galvanised (HDG) sheets are CRCs coated with a layer of zinc through a hot-dip galvanising process. This coating provides corrosion resistance and durability, making HDG sheets suitable for outdoor structures, roofing, fencing and automotive components. In addition, coated steel products such as galvanised and galvannealed sheets offer enhanced corrosion protection and are widely used in construction, infrastructure and manufacturing sectors.

**Long-steel (non-flat steel)**

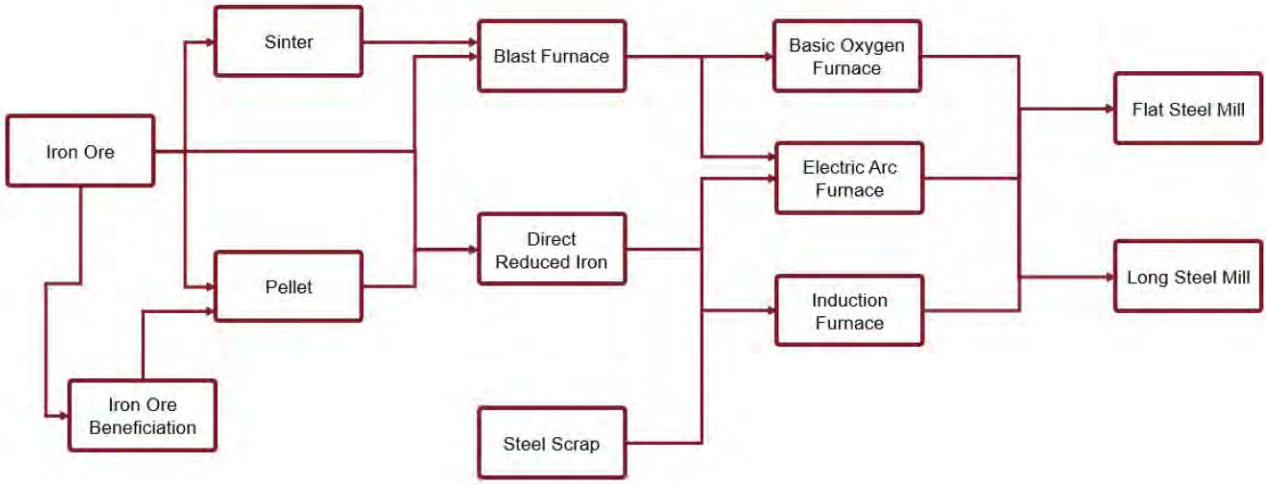
Long steel products, characterised by their elongated shape, play a critical role in various industries, including construction, infrastructure, manufacturing and engineering. These products are manufactured through processes such as steelmaking, casting, rolling and finishing, resulting in a diverse range of shapes, sizes and specifications tailored to meet specific customer requirements.

One of the most common long steel products is reinforcement bars (rebars), which are widely used in construction projects to reinforce concrete structures and provide tensile strength. Rebars are typically made from carbon steel and have a ribbed surface to improve bonding with the concrete. They come in various grades, sizes and configurations to meet different structural requirements. For example, high-strength rebars are used in seismic zones or high-rise buildings, while epoxy-coated rebars offer corrosion resistance in harsh environments.

Cold Twisted Deformed (CTD) bars and Thermo-Mechanically Treated (TMT) bars are both used as reinforcement in concrete construction, but they differ significantly in manufacturing processes and properties. CTD bars, are produced by twisting hot-rolled steel bars, which increases their tensile strength but makes them prone to brittleness and corrosion due to surface cracks. In contrast, TMT bars undergo a controlled quenching and self-tempering process, which results in a strong outer layer and a ductile core, providing superior strength, flexibility, and corrosion resistance. TMT bars are widely preferred over CTD bars for their enhanced earthquake resistance, longer lifespan, and reduced susceptibility to environmental damage, making them a safer and more reliable option in modern construction. Wire rods are another essential long steel product category with a circular cross-section, typically produced from low-carbon steel billets through hot rolling. They serve as feedstock for various wire products used in construction, manufacturing and automotive industries. They are drawn through a series of dies to reduce their diameter and improve surface finish, producing wires of different gauges and properties. Wire products manufactured from wire rods include wire ropes, nails, screws, fences, cables, springs and wire mesh, among others.

Structural sections, also known as structural steel shapes, are long steel products used in a wide range of structural applications. They include beams, channels, angles and rails. Beams, also called I-beams or H-beams, are characterised by their H-shaped cross-section and are commonly used in building construction for framing and supporting structures. Channels, with a C-shaped cross-section, are used for similar purposes as beams but offer different load-bearing characteristics. Angles are L-shaped structural steel sections used for bracing, framing and decorative applications. Rails, on the other hand, are long steel sections used in railway tracks to provide support and guidance for trains, ensuring safe and efficient transportation of goods and passengers.

**Figure 7: Iron and steel making process summary**



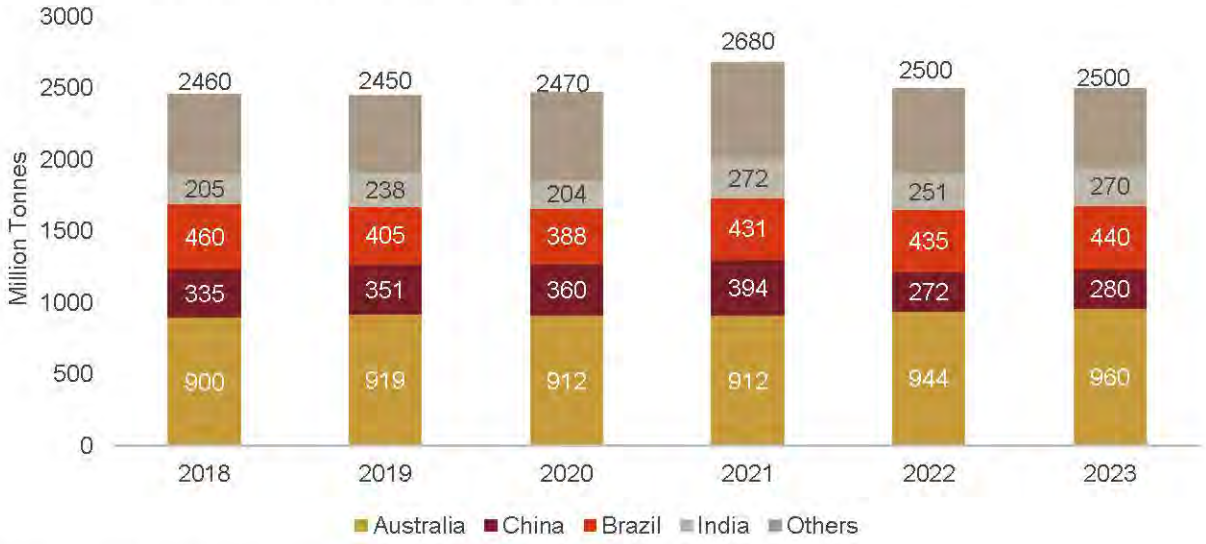

*Source: CRISIL MI&A Research*

# 3. Global iron and steel industry overview

## 3.1 Iron ore

Iron ore is the main raw material in steel making. Manufacturing a tonne of steel requires 1.5-1.7 tonne of iron ore, apart from other raw materials, such as coking coal, thermal coal and ferro alloys. As steel becomes more integrated into global value chain, its basic raw material, iron ore, assumes major importance. Almost 98% iron ore mined globally is used in steelmaking. Iron ore is mined in about 50 countries and its production depends on the geological presence of reserves in a particular region, the feasibility of mining the same and technologies available.

**Figure 8: Production of iron ore (2018-2023)**




*Source: World Steel Association, USGS, CRISIL MI&A Research*

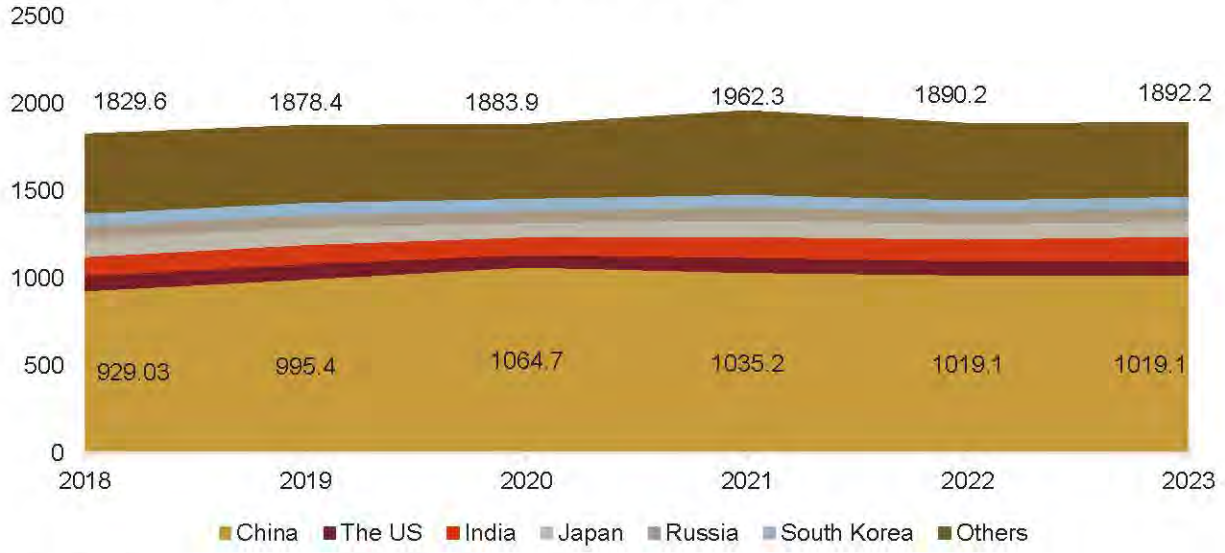
Iron ore production is estimated to have remained stable, touching 2,500 million tonne (MT) in 2023, as steel production (key driver for iron-ore production) remained almost the same as in 2022.

In 2022, global iron ore production stood at 2,500 MT, down 6.7% on-year due to lower demand from major crude steel producing nations. Over the period, crude steel production fell 3.7% on-year. According to the World Steel Association (WSA), the global steel sector used 2.3 billion tonne of iron ore to produce 1.95 billion tonne of crude steel in 2021. Between 2019 and 2023, global iron ore production in estimated to have increased with a CAGR of 0.3%.

Australia is the leading producer of iron ore, accounting for 38% of the global output in calendar 2023. The other major iron ore producers are Brazil, China and India, having a share of 18%, 11.2% and 10.8%, respectively. These four countries produced 75-80% of the global iron ore output from 2018 to 2023.

## 3.2 Crude steel Production

**Figure 9: Production of crude steel over 2018-2023 (in MT)**




*Source: World Steel Association (WSA), CRISIL MI&A Research*

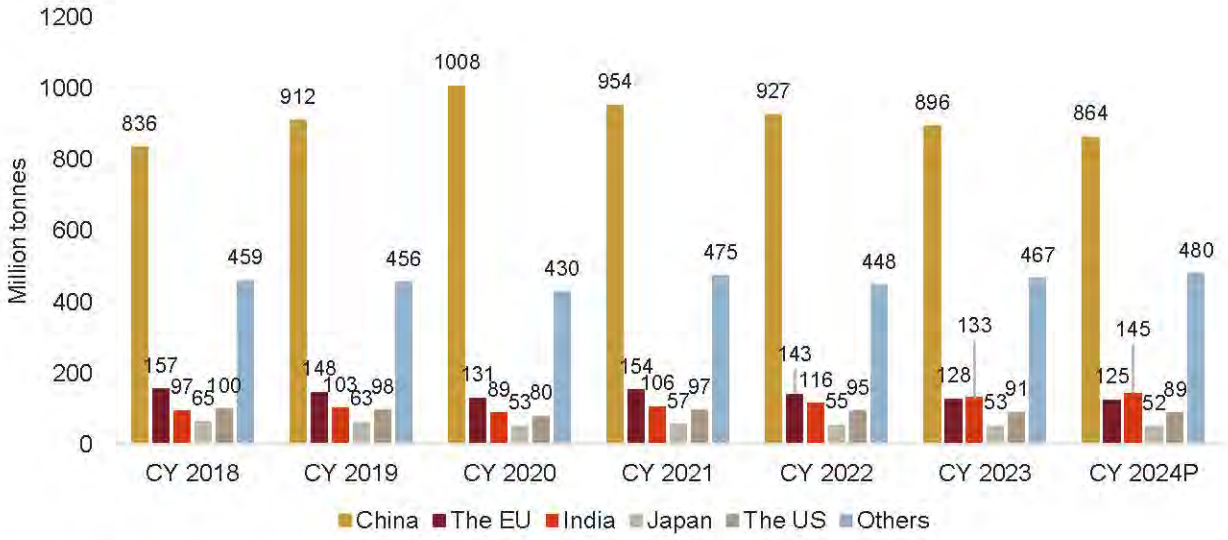
Crude steel production grew at a 0.7% CAGR from 2019 to 2023. Production remained flat on-year at 1892 MT in 2023 compared with 1890 MT in 2022. Steel production growth of major countries slowed due to concerns over the real estate sector in China and the impact of recessionary pressure across the globe on demand as well as production. However, production in India grew in double digits due to fast-paced growth in infrastructure and construction segments.

Global crude steel production fell 3.7% on-year to 1,888 MT in 2022 owing to a weak global economy and subdued Chinese demand due to Covid-19 lockdowns.

Usually, China accounts for 53-54% of global steel production due to enormous domestic demand from real estate, machinery and infrastructure sectors. Besides being the world's second most populous country, China is also the world's largest manufacturing hub and exporter of goods. However, Chinese steel production growth is expected to moderate in the future due to its ambitious decarbonisation goals and saturation in end-user segments, impacting the global steel sector.

Meanwhile, the Indian steel sector is expected to witness a healthy CAGR in the coming years due to growing demand from end-use sectors such as infrastructure, building and construction, and automobiles.

**Figure 10: Global steel consumption (2018-2024)**




*Source: WSA, CRISIL MI&A Research,*
*Note: 2024 numbers are estimate*

**Table 5: Global finished steel consumption growth (2018-2024)**

| Global demand growth % | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024E |
|---|---|---|---|---|---|---|---|
| Total | 5% | 4% | 1% | 3% | -4% | -1% | -1% to 0% |
| China | 8% | 9% | 11% | -5% | -3% | -3% | -4% to -3% |
| The EU | (4% | -6% | -12% | 18% | -10% | -11% | -2.5% to -1.5% |
| India | 9% | 6% | -13% | 19% | 8% | 15% | 8% to 9% |
| Japan | 2% | -3% | -17% | 9% | -4% | -3% | -2% to -1% |
| The US | 2% | -2% | -18% | 21% | -3% | -4% | -2% to -1% |
| Others | 3% | -1% | -8% | 12% | -6% | 3% | 2.5% to 3.5% |

*Source: WSA, CRISIL MI&A Research*
*Note: 2024 numbers are estimates*

According to WSA, global finished steel consumption declined 1.1% on-year to 1,763 MT, on a 3% slowdown in demand in China due to its ailing property sector. Similarly, demand declined by 11% in Europe and by 4% and 3% respectively in US and Japan due to recessionary pressures, labour shortage and cost pressures. However, Indian demand grew 15% on-year with robust demand from allied sectors. Over 2019-2023, finished steel consumption grew at a 0.6% CAGR.

Indian steel demand growth has outpaced the global demand growth rate for the last five years, it is expected to grow at more than 3x the global steel demand growth rate in the next five years.

**Outlook**

Global steel consumption is likely to decline by (-1%) - 0% on-year in 2024, although demand growth rates in India and 'Others' region is expected to be positive. In the EU, the effects of geopolitical uncertainty, inflation and energy prices are expected to subside in 2024 and steel demand is expected to improve in the second half of 2024. Additionally, the US Federal Reserve is expected to announce a series of interest rate cuts this year that could help revive the housing sector. Various policies promoting clean infrastructure projects will drive demand after two years of de-growth.

The revival of China's property sector will hinge on the government's actions. The results of a series of stimulus announcements announced in 2023 were expected to emerge this year. However, demanded decline in 2024 as well. India's consistent healthy growth rates make it stand out among its global peers. With moderation in segmental growth, demand is expected to grow 8-9% on-year in 2024.

**Table 6: Crude steel per capita consumption (finished steel products)**

| in kg | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|
| China | 590 | 641.3 | 707.6 | 669 | 645.8 | 628.3 |
| The US | 300.4 | 291.9 | 238.2 | 288 | 279.4 | 266.3 |
| India | 70.7 | 74.2 | 64 | 75.5 | 81.1 | 93.4 |
| Japan | 518.1 | 502.5 | 420.3 | 460.7 | 443.6 | 432.5 |
| Russia | 283.7 | 298.6 | 290.6 | 302.7 | 288.3 | 309.1 |
| South Korea | 1039.3 | 1027.5 | 948.9 | 1081.2 | 988 | 1056.6 |
| World | 223.2 | 229.2 | 228.4 | 233 | 221.8 | 219.3 |

*Source: WSA, CRISIL MI&A Research*

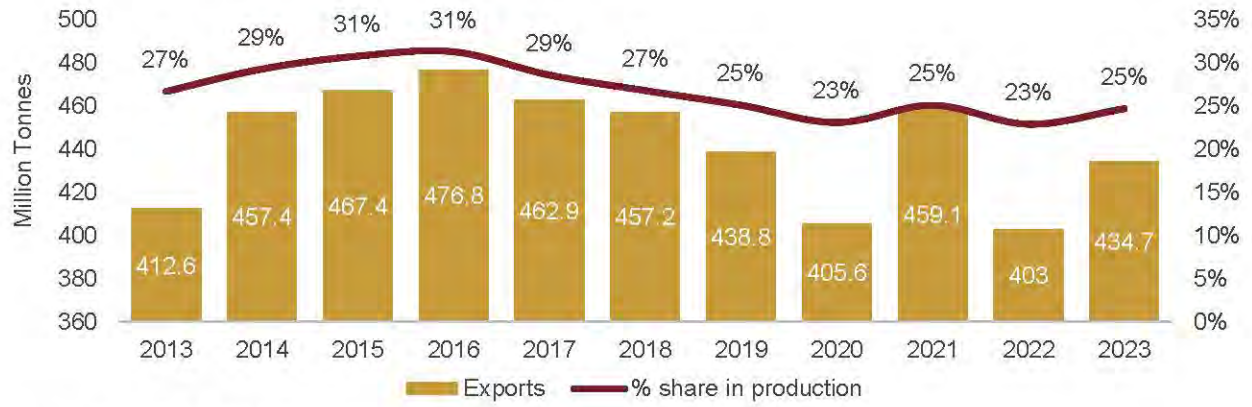
South Korea, a developed country with high per capita income, had the highest per capita steel consumption of 1056.6 kg in 2023 due to its enormous automobile and ship building sectors. It has surpassed China and Japan, which are major steel producers, in terms of per capita consumption of steel.

Currently, India's per capita consumption of steel, a key developmental indicator, is still significantly small compared with developed countries. India had the lowest per capita steel consumption of 93.4 kg in 2023, a rise from 75.5 kg in 2021. India's low steel per capita consumption is due to its lower per capita income. However, the National Steel Policy aims to increase per capita consumption of steel to 160 kg by 2030, which indicates a positive outlook for the domestic steel industry.

## 3.3 Global steel trade

Steel is a major commodity traded globally. Global steel exports stood at 435 MT in 2023. The five major exporters of steel products were China, Japan, South Korea, the EU (27) and Germany. The trade statistics given below are inclusive of semi-finished and finished steel trade.

**Figure 11: Steel trade (2013-2023)**



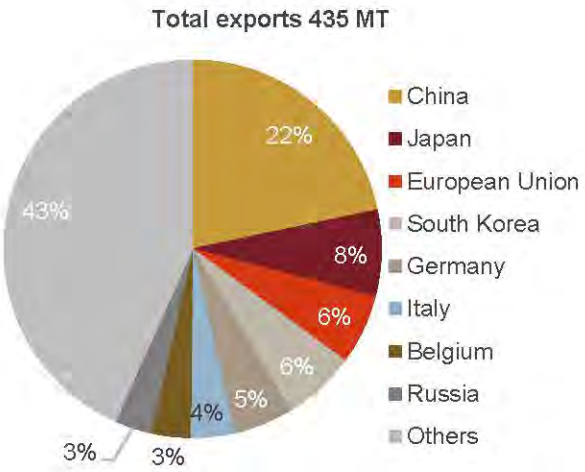

*Source: WSA, CRISIL MI&A Research*

**Top exporters and importers (2023)**

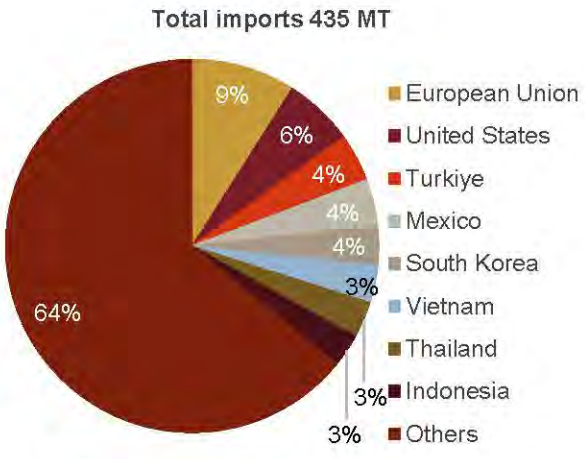
In 2023, global steel exports increased by 7.9% on-year, as demand in China, a key consumer, was weak due to the crisis in real estate sector, while production remained stagnant leading to Chinese mills exporting surplus at cheaper prices.

**Figure 12: Major exporters and importers of finished steel**

**Major exporters (2023)**




**Major importers (2023)**




*Source: World Steel Association, CRISIL MI&A Research*

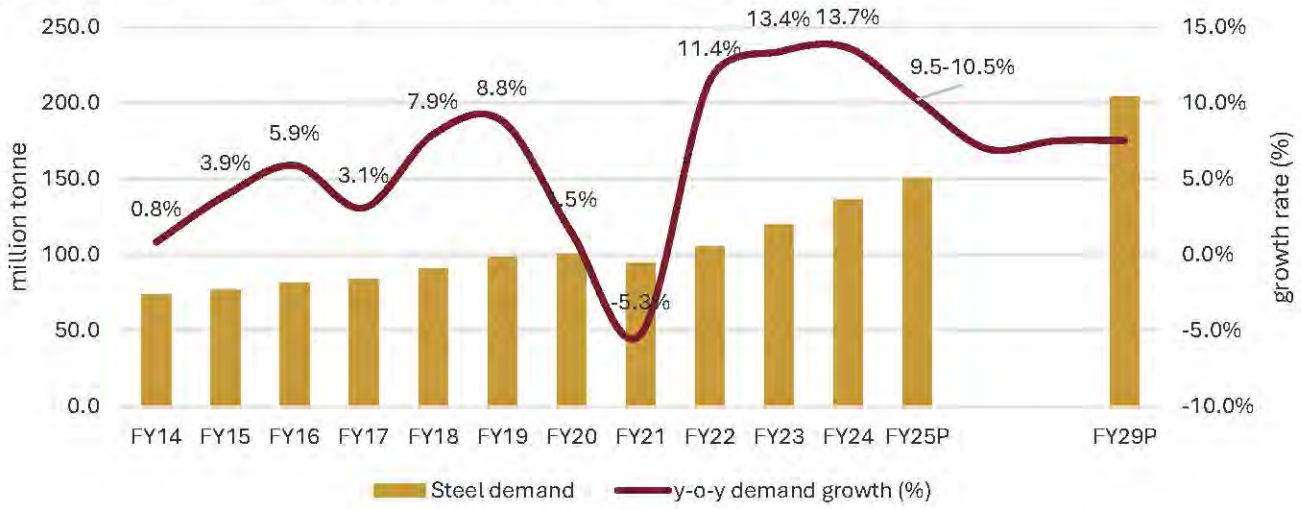
China remained a key exporter in 2023, enjoying a global market share of 21.6%. Japan and South Korea are amongst key economies with a large share of production focused on exports, together accounting for ~14% of global exports.

The EU (27) remained the top importer of steel in 2023, with a share of 9%. The other key importers, excluding intra-European trade, are the US (6%), Turkey (4%) and Mexico (4%).

# 4. Overview of Indian steel industry

## 4.1 Domestic steel demand – review and outlook

**Figure 13: Indian finished steel consumption review and forecast**




*Source: JPC, CRISIL MI&A Research*

Domestic steel demand grew at a healthy CAGR of 6.7% between fiscals 2019 and 2024 despite the pandemic impact, wherein domestic demand momentum declined to 1% in fiscal 2020 and -5% in fiscal 2021.

In the post-pandemic era, rapid recovery due to pent-up demand and increased government spending on infra and related sectors led to three consecutive years of double-digit demand growth. Demand rose 11.4% in fiscal 2022, 13.4% in fiscal 2023 and 13.7% in fiscal 2024. While growth momentum is expected to moderate in fiscal 2025 to 9.5-10.5%, it should remain above the decadal average at a 6-8% CAGR over fiscals 2025 to 2029.

**Fiscal 2023** was a volatile year for the commodity market due to supply-chain disruptions induced by geopolitical uncertainty, leading to prices of coking coal, iron ore, pig iron and steel rallying to new highs. The effect of elevated prices directly impacted procurement decisions among end-use segments in the first quarter of fiscal 2023. To control soaring steel and raw material prices, the Government of India imposed export duty on steel and its raw materials in May 2022. Consequently, export volumes declined from 13.5 MT to 6.7 MT. Demand from the automobile sector was robust across sub-segments. Sales increased 27% for passenger vehicles (PVs; crossed the pre-pandemic mark), 19% for two-wheelers, 12% for tractors and 34% for commercial vehicles (CVs). Post-monsoon demand revival and the festive season ensured demand growth, with the flat steel segment growing 16.6% and the non-flat steel segment increasing 10.6% during the year.

**Fiscal 2024** experienced strong demand from allied sectors. Building, construction and infrastructure, which account for more than 60% of domestic steel demand, remained the key drivers due to increasing spending by central government on infra heavy sectors, ahead of elections. From April-December 2023, the central government's capital expenditure rose ~47% for road ministry and ~52% for railways compared with the same period the previous fiscal. Steel demand from the automobile sector also remained healthy. Steel demand from

automobile sector moderated on a higher base of fiscal 2023 with PV and two-wheeler sales estimated to be 8.4% and 13.3%, respectively.

**Fiscal 2025 outlook:** Given the high base of fiscal 2024, demand momentum is expected to decline in fiscal 2025. Above long period average rainfall and general elections during the first half of the fiscal year had an impact on the construction activities and in turn on steel demand. As per the India Meteorological Department (IMD), the 2024 southwest monsoon rainfall (June to September) averaged 8% above the long-term average (LTA). Subsequent demand recovery in the third and fourth quarter will result in a cumulative demand growth of 9.5-10.5% in fiscal 2025.

Over the next five fiscals, i.e., fiscal 2025 to fiscal 2029, CRISIL MI&A Research expects steel demand to grow at a CAGR of 7-9%, well supported by end-use sectors and government spending and complemented by capacity addition by large integrated steel producers.

## 4.2 Major demand drivers for the steel sector

Based on end use, steel demand can be attributed to the following four major demand buckets for fiscal 2024:

- Infrastructure (29-31%)
- Building and construction (35-40%)
- Transportation (7-9%)
- Engineering, fabrication and others (23-27%)

**Infrastructure**

There has been a sharp rise in the capex spending towards infrastructure. In FY24, the Central government's capital expenditure has been ~28% higher for the road ministry and ~52% higher for railways compared to previous fiscal. Infrastructure to continue its strong momentum, led by the government's spending, primarily across its flagship schemes, such as PM Gati Shakti and the National Infrastructure Pipeline. Projects focusing on port connectivity, tourism infrastructure and amenities on islands, including Lakshadweep, will also support the infra segment along with ongoing metro construction, and development of airports.

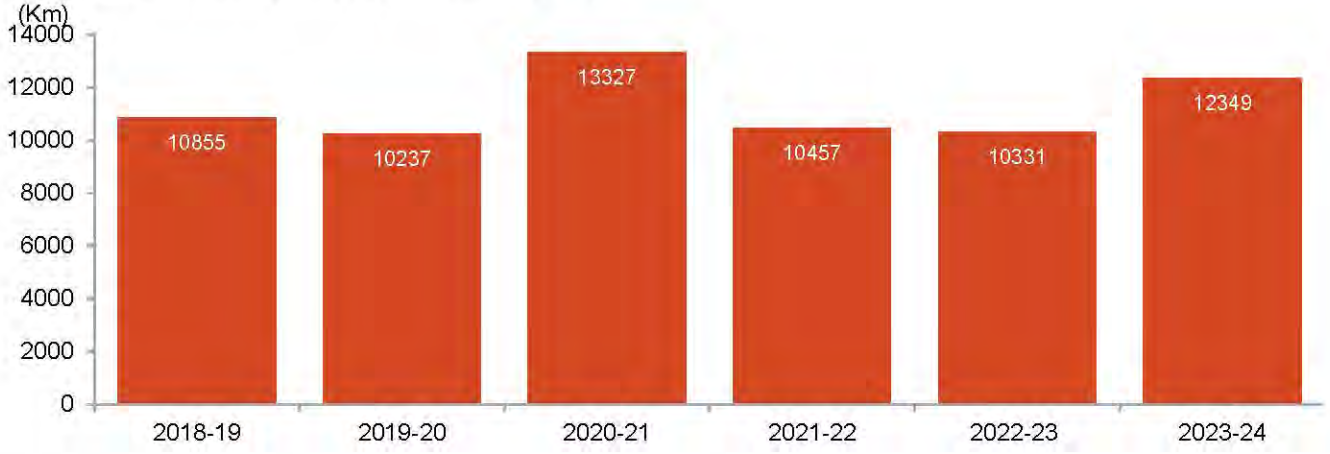
While the infrastructure segment is expected to remain a key demand driver, only a marginal rise of 4% in capex for core infrastructure ministries for fiscal 2025BE over fiscal 2024RE is expected to slow down steel demand growth from the infrastructure segment to 13-15% in fiscal 2025. The government's focus on developing dedicated rail corridors for the energy, mineral and cement sectors, higher budget allocation for metro, UDAN scheme for airports, expansion of metro rail and Namo Bharat to more cities, ongoing NHAI and Bharatmala road projects should continue to support infrastructure demand in fiscal 2025. For the medium term, CRISIL MI&A expects demand for steel demand from infrastructure segment to grow at a CAGR of 9-11% between FY25-FY29.

**Roads-NHAI:** Bharatmala Pariyojana, an umbrella project of the Central government launched in 2015, aims to improve efficiency in the roads sector. It is expected to supersede the National Highways Development Project (NHDP) and envisages the construction of 83,677 km of highways under the following categories: national corridor (north-south, east-west, and Golden Quadrilateral), economic corridor, inter-corridor roads, and feeder roads. Bharatmala, along with the schemes currently undertaken, requires a total outlay of Rs 6.9 trillion. The roads and highways capex growth for the next fiscal has witnessed a sharp moderation in growth rate and is only higher by 3% vis-à-vis fiscal 2024RE. Similar to the previous fiscal, the entire allocation of Rs 2,72,000 crore would be via

Gross Budgetary Support (GBS) as the Internal and External Budgetary Resources (IEBR) limit has been completely eliminated in order to reduce the National Highways Authority of India's (NHAI) dependence on market borrowings. The budgetary allocation of Rs 1,68,000 crore towards the NHAI for the next fiscal has remained flattish vis-à-vis fiscal 2024RE.

The Phase I target is ~34,800 km: 24,800 km of various categories of roads and 10,000 km of residual NHDP projects at a cost of Rs 5.35 lakh crore. As of Feb 2024, ~26,418 km has been awarded and ~15,549 km has been completed (~45% completion of target). The balance projects are targeted for awarding by fiscal 2025. In fiscal 2024, awarding momentum has been marred by various roadblocks. Phase-1 has witnessed significant cost overrun on account of costlier land acquisition and high inflation. As a result, execution pace is expected to moderate in fiscal 2025.

**Figure 14: National highways construction (km)**

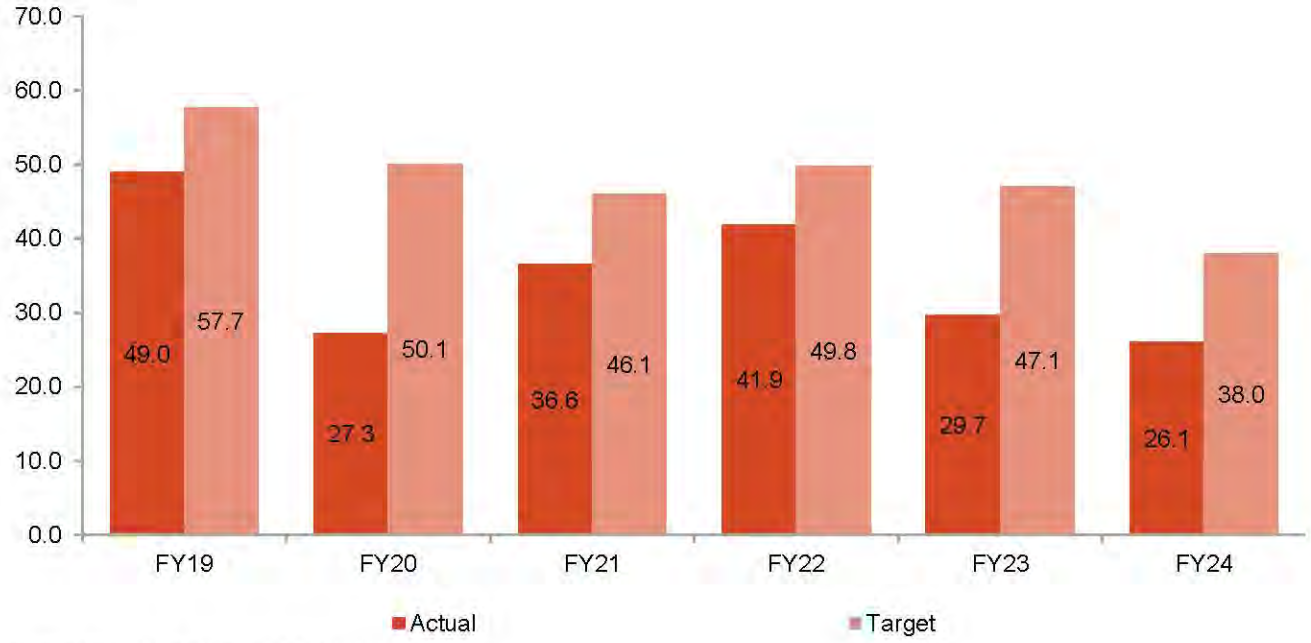



*Source: Ministry of Road Transport and Highways, CRISIL MI&A Research*

**Roads - PMGSY:** The PMGSY seeks to provide all-weather road connectivity to all eligible unconnected habitations, existing in the core network in rural areas of the country. PMGSY-I was launched in 2000, and 97% of the target was achieved. Under PMGSY-II, 75% of the target was achieved. The target for PMGSY-III is 40% lower than the length of roads constructed over the past five fiscals. Execution under PMGSY improved in fiscal 2022 as ~41,971 km was constructed against a revised target of ~50,000 km (~84% completion rate). The original target of ~61,700 km was revised downward to ~50,000 km. In fiscal 2023, a target of 47,171 km was set under the scheme, of which, ~29,700 km has been constructed. Further out of a lower target of ~38,000 km set for fiscal 2024, around 26,100 km has been constructed during the year (~69% achievement). Going ahead, the pace of execution is expected to moderate further in fiscal 2025 since the budgetary allocation for PMGSY has been lower by 29% for FY2025BE over FY2024RE.

**Figure 15: PMGSY Road construction v/s target under**

('000 Km)




*Source: PMGSY, CRISIL MI&A Research*

**Dedicated Freight Corridor (DFC):** Dedicated freight corridors (DFCs) are intended to help the Indian Railways regain lost freight share by cutting the turnaround time between importing and consuming destinations, compelling cement industries to realign their logistics strategies. Thus, roads that have outperformed railways over the past decade will lose some share to railways once DFCs are commissioned.

The DFC project is estimated to cost Rs 124,005 crore for the eastern (1,337 km) and western (1,506 km) sectors. As per the project details, the Western DFC covers 1,504 km, linking Jawaharlal Nehru Port Trust near Navi Mumbai, Maharashtra, to Dadri, Uttar Pradesh, passing through Vadodara, Ahmedabad, Palanpur, Madar, Phulera and Rewari. The Eastern DFC covers 1,337 km, connecting Ludhiana, Punjab, to Dankuni near Kolkata, West Bengal, passing through Haryana, Bihar, Uttar Pradesh, and Jharkhand. Both routes account for more than 20% of the pan-India primary freight in billion tonne kilometre (BTKM) terms. Container traffic (~65% of the Western DFC) and bulk commodities (~89% of the Eastern DFC), which dominate the freight carried on these routes, are expected to shift to railways. As of April 2024, 2,741 kms out of 2,843 km have been commissioned (~91% physical progress and 88% financial progress was achieved under both EDFC and WDFC). ~100% of land acquired for WDFC. EDFC all routes have been commissioned while WDFC completion targets are delayed up to December 2024.

**Sagarmala:** As a part of the Sagarmala programme, more than 800 projects at an estimated cost of ~Rs 5.48 lakh crore have been identified for implementation. This programme includes logistics projects from various categories such as modernisation of existing ports and terminals, new ports and terminals and tourism jetties, enhancement of port connectivity, inland waterways, lighthouse tourism, industrialisation around ports, skill development, technology centres.

At an overall level, as of April 2024, 262 projects worth Rs 1.40 lakh crore have been completed out of 839 identified projects worth Rs. 5.79 lakh crore under the scheme; 577 projects worth Rs 4.37 lakh crore are under implementation and various stages of development. Projects under Sagarmala include the Special Economic Zone

at the Jawaharlal Nehru Port Trust, Smart Industrial Port City at Deendayal Port and Paradip Port, and the Coastal Employment Unit at the V O Chidambaranar Port.

**Table 7: Construction status under Sagarmala**

| Project/Pillar | Completed | | Under Implementation | | Under Development | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. of Projects | Cost (Rs.Cr.) | No. of Projects | Cost (Rs.Cr.) | No. of Projects | Cost (Rs.Cr.) | No. of Projects | Cost (Rs.Cr.) |
| Port Modernization | 98 | 32,066 | 62 | 75,630 | 74 | 1,82,652 | 234 | 2,91,622 |
| Port Connectivity | 91 | 57,997 | 57 | 68,010 | 131 | 80,366 | 279 | 2,06,363 |
| Port Led Industrialization | 9 | 45,865 | 3 | 9,247 | 2 | 775 | 14 | 55,887 |
| Coastal Community Development | 21 | 1,559 | 32 | 6,166 | 28 | 3,847 | 81 | 11,573 |
| Coastal Shipping and IWT | 43 | 2,956 | 63 | 4,665 | 125 | 6,980 | 231 | 14,601 |
| **Total** | **262** | **1,40,443** | **217** | **1,63,738** | **360** | **2,74,620** | **839** | **5,79,562** |

*Source: Ministry of Shipping, CRISIL MI&A Research, Data as of April 2024*

**Urban infrastructure:** Urban infrastructure includes construction-intensive mass rapid transit system (MRTS), bus rapid transit system (BRTS), water supply and sanitation (WSS) projects, smart cities, and related infrastructure development. Investment in India's urban infrastructure is driven by government schemes such as AMRUT, Swachh Bharat, Clean Ganga and Jal Jeevan Mission. WSS projects, metro construction in major Indian cities, and commencement of work on 105 smart cities have boosted urban infrastructure investment in the past five years. The government intends to expand metro rail and Namo Bharat to more cities with focus on rapid urbanisation. For this, central government has allocated Rs. 24,930 crore for FY25BE against Rs. 23,100 crore in FY24RE (7.9% higher).

**PM Gati Shakti Master Plan:** PM Gati Shakti National Master Plan (NMP) was launched on 13th October 2021 for providing multimodal connectivity infrastructure to various economic zones. PM Gati Shakti National Master Plan provides a comprehensive database of the trunk & utility infrastructure, ongoing & future projects of various Infra structure and Economic Ministries/Departments of Central Government and States/UTs. This data is integrated with the GIS-enabled PM Gati Shakti platform, there by facilitating the integrated planning, designing, and monitoring of the Next Generation infrastructure projects on a single portal.

Economic Zones like textile clusters, pharmaceutical clusters, defence corridors, electronic parks, industrial corridors, fishing clusters, agri zones etc. are being mapped for integrated infrastructure planning and make Indian businesses more cost competitive. This will boost economic growth, attract foreign investments while de-risking investments by visualizing the connectivity, and enhance the country's global competitiveness in export markets.

While the development of integrated infrastructure development is addressed through the PM Gati Shakti NMP, efficiency in services (like processes, digital systems, and regulatory framework) and human resources is addressed by the National Logistics Policy, 2022 through its Comprehensive Logistics Action Plan (CLAP). NMP and National Logistics Policy together provide a framework for creating a data-driven decision support mechanism for an efficient logistics ecosystem aimed at reducing logistics costs and enhancing logistics efficiency in the country.

PM Gati Shakti is a Whole-of-Government approach adopted to facilitate integrated planning of multimodal infrastructure through collaboration among the concerned Ministries. As of Dec 2023, the Logistics Division of DPIIT has conducted 62 Network Planning Group (NPG) meetings to assess the comprehensive area-based socio-economic development of infrastructure projects.

**Table 8: Targets under PM Gati Shakti Master Plan for fiscal 2025**

| Ministries | Parameter | Target |
|---|---|---|
| **Ministry of Roads, Transport and Highways** | Total Length of NH in the country (in kms) to be built | 2,00,000 |
| **Ministry of Railways** | Total cargo capacity to be achieved in the country (in million tonnes) | 1,600 |
| **Ministry of Civil Aviation** | Total no. of Airports/ Heliports/Water/ Aerdromes to be built in the country | 220 |
| **Ministry of Ports, Shipping and Waterways** | Total cargo capacity to be achieved in ports (in MMTPA) | 1,759 |
| **Ministry of Petroleum and Natural Gas** | Total length of pipelines to be built (in kms) | 34,500 |
| **Ministry of Power** | Total transmission networks to be built (in circuit kms) | 4,54,200 |
| **Ministry of Renewable Energy** | Total Capacity to be achieved (in GW) | 225 |
| **Department of Telecommunications** | Total no. of Gram Panchayats to be connected | 2,600,00 |

*Source: Ministry of Commerce & Industry, GOI, CRISIL MI&A Research*

**National Infrastructure Pipeline:** The government launched the National Infrastructure Pipeline (NIP) with a forward-looking approach and with a projected infrastructure investment of around Rs. 1,11,00,000 crore during FY20-25 to provide high quality infrastructure across the country. The NIP has been made on a best effort basis by aggregating the information provided by various stakeholders including line ministries, departments, state governments and private sector across infrastructure sub-sectors identified in the Harmonised Master List of Infrastructure. To draw up the NIP, a bottom-up approach was adopted wherein all projects costing greater than Rs 100 crore per project under construction, proposed greenfield projects, brownfield projects and those at the conceptualization stage were sought to be captured. During the fiscals 2020 to 2025, sectors such as energy (24%), roads (18%), urban (17%) and railways (12%) amount to ~71% of the projected infrastructure investments in India. The NIP currently has 8,964 projects with a total investment of more than Rs. 108,00,000 crore under different stages of implementation.

**Building and construction**

Steel demand from building and construction segment, supported by increase in government spending, is estimated to have increased by ~11% in fiscal 23 and by ~14% in fiscal 24 and is expected to have moderated in fiscal 25, with a growth rate of ~7-9% and by ~6-8% CAGR over the medium term between FY25-FY29.

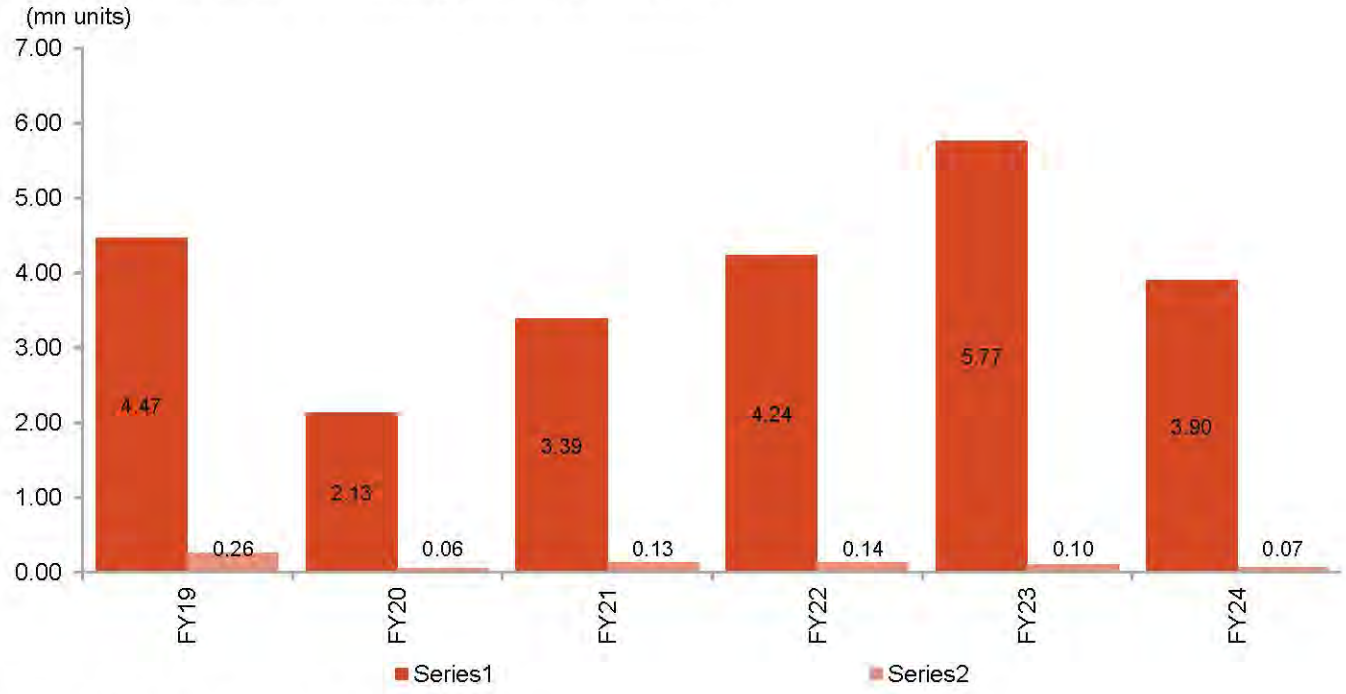
**PMAY-G:** To achieve the Housing for All by 2022 mission, the government launched a restructured rural housing scheme, PMAY-G in November 2016, with the target of constructing 29.5 million houses with basic amenities by 2022. As of Aug 2024, ~29.4 million units were sanctioned, of which, construction of ~26.3 million houses have been completed (~89% completion against sanctioned units), and ~3.2 million units are under construction under the PMAY-G scheme.

In fiscal 2021, the scheme gained traction on the back of the mass exodus of labourers to their native villages, which propelled them to build their own houses during the lockdown; healthy rabi productivity; increase in crop procurement; and government fund allocation through the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA). In fiscal 2022, construction picked up further on a high base since higher sanctioning over fiscals 2020 and 2021 led to strong execution.

Construction pace ramped up sharply in fiscal 2023 under the scheme in order to achieve set targets. However, pace slowed down during second half of fiscal 2024 as uneven and delayed monsoon impacted agriculture activities regionally. Execution pace under PMAY-G is expected to slightly moderate in the first half of fiscal 2025, due to fund diversion during elections, however, it is expected to ramp up in the second half of fiscal 2025. Also, an expectation of above normal monsoon to aid agri. profitability in the current fiscal and government focus on rural schemes to be a positive.

The announcement in Vote of account budget 2025, to bring 20 million additional houses under the ambit of PMAY-Gramin scheme over the next five years, to support demand from the housing segment in the long run. Further, the actual shortage remains well above the deficit identified at 29.5 million units and will continue to drive demand even beyond fiscal 2026. Hence, in the longer run, rural housing is expected to grow by healthy 6-7% CAGR over the next five years, supported by lower development base and continued concretisation of kutcha houses.

**Figure 16: Construction of housing units under PMAY-G**



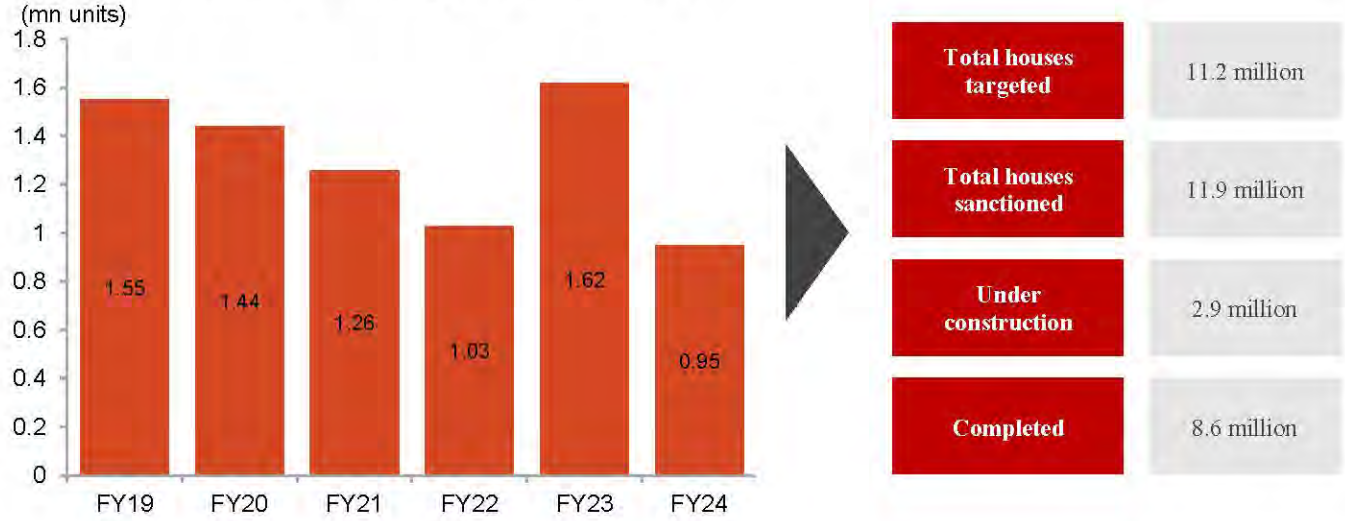

*Source: CRISIL MI&A Research, MoRD*

**PMAY-U:** PMAY-U is an affordable housing scheme under implementation from 2015. It seeks to achieve the objective of Housing for All by 2022. The scheme comprises four components: (i) in situ rehabilitation of existing slum dwellers (using the existing land under slums to provide houses for slum dwellers) through private participation; (ii) credit-linked subsidy scheme for economically weaker sections and low- and middle-income groups; (iii) affordable housing partnership with states/union territories /cities, including private sector and industries; and (iv) subsidy for beneficiary-led individual house construction.

The PMAY-U programme witnessed healthy construction in fiscals 2019 and 2020, but lost momentum in fiscal 2021 as urban construction was adversely impacted by the pandemic-induced lockdown. While ~1.55 and ~1.44 million units were constructed in fiscals 2019 and 2020, respectively, ~1.26 million were constructed in fiscal 2021, despite the pandemic, as construction pace was healthy in the second half. In fiscal 2022, construction momentum slowed down further to ~1.03 million units due to weak execution in the second quarter. In fiscal 2023, construction pace recovered with fast-paced and steady execution of ~1.62 million units during the fiscal.

After a healthy run-in previous fiscal, construction pace moderated in fiscal 2024 with ~0.95mn units built after witnessing fast-paced execution of ~1.62 million units in fiscal 2023. While sanctions have already surpassed targeted houses (~11.9 million houses sanctioned as of August 2024), over ~8.6 million houses have already been completed (~72%) and another ~2.9 million are under various stages of construction. However, despite rise in approvals, execution pace slowed down during FY24 on the back of various reasons like delays in fund releases, political instability, etc. across regions. In fiscal 2025, the pace of execution is expected to slow down, as the ministry targets the scheme's closure by December 2024. However, with many under-construction units, the scheme's execution is likely to be extended beyond December 2024.

**Figure 17: Construction of housing units under PMAY-U**




*Note: Data as of 15th March 2024; sanctioned units include under-construction and completed units.*
*Source: CRISIL MI&A Research, Ministry of Housing and Urban Affairs, Government of India*

**Real estate:** On the real estate front, with home buyers making use of reduction in stamp duty in metro cities, aided by bumper offers, residential sales numbers indicate a stunning post-pandemic recovery. The work-from-home culture and social distancing norms have boosted affordable and mid-segment home buying. Real estate construction surged in fiscal 2022 and remained strong in fiscal 2023. After witnessing strong momentum over the past two fiscals, demand growth saw some moderation in fiscal 2024 amid higher interest rates and rise in capital values. However, the industry is structurally stronger than it was before the pandemic struck and to witness continued momentum in fiscal 2025 driven by consistent demand that aligns with an upward trend primarily attributed to the necessity for larger living spaces and an enhanced lifestyle, catalyzed during the pandemic. The focus remains inclined towards acquiring ready or near-ready inventory, further strengthens demand in this segment. Additionally, interest rate cuts in fiscal 2025 to improve affordability and increase demand, thereby auguring well for steel demand from the segment.

**Transportation**

Steel demand from the automobile industry accounts for 7-9% of total domestic demand. Both flat and long steel are used in various parts of automobiles. Demand from all automobiles sub-segments, such as passenger vehicles, two-wheelers and commercial vehicles, are positive over the medium term and will continue to drive steel demand. On a high base of fiscal 24 and higher inventory across the value chain, demand for steel from transportation sector is expected to grow by ~0-2% in FY25 and by a CARG of 4-6% over the FY25-FY29.

**Passenger vehicles** (Steel intensity- medium): Over fiscals 2019-2024, passenger vehicle volume saw a CAGR of 3%, due to two consecutive years of declines in fiscals 2020 and 2021. Sales of small cars increased ~19% in fiscal 2023 as several users moved towards the lower end of the spectrum due to pandemic-impaired income sentiments as well as unavailability of Utility Vehicles (UVs) owing to chip shortage. Sales of small cars declined by ~11% in fiscal 2024 as several users moved towards the lower end of the spectrum due to pandemic-impaired income sentiments as well as unavailability of UVs due to chip shortage.

The passenger vehicle market is expected to decline by 1-3% year-on-year in fiscal 2025, reaching around 4.1 million units. This is on a base of 4.2 million units in fiscal 2024, when the market grew by 8%. The growth slowdown is attributed to weaker retail sentiment coupled with sales push by the OEMs resulting in an inventory buildup. Several factors have contributed to this slower retail momentum. First, the general elections in Q1 FY25 have led to a cash crunch and reduced government spending. Additionally, an extended heatwave, continued high interest rates, evaporation of pent-up demand unseasonal and extended rainfall have impacted consumer spending. As a result, wholesale volumes in the first half of FY25 remained flat on-year, with high inventory levels and sluggish retail sales. Inventory levels reached a record high of 71-76 days at the start of Q3 FY25 as OEMs geared up for the festive season

The UV segment is expected to exert pressure on the small-car and large-car segments, limiting growth prospects. After a 26% growth in fiscal 2024, UV and van sales are likely to register a 7-9% CAGR during the forecast period (CAGR FY19-24 was 18%), driven by a continued shift in consumer preferences, multiple model launches, and availability of superior features at affordable prices. Entry of new players in the UV segment is also expected to aid traction. Moreover, replacement demand is likely to rise, as car owners opt for newer models due to higher affordability, competitive pricing of new models, and easy availability of finance.

Overall, the car and UV segment is expected to sustain a ~5-7% CAGR over FY24-FY29.

**Two-wheelers** (Steel intensity- low): Two-wheeler volumes are expected to improve by ~11-13% in FY25 after robust growth of 14% in FY24.

This improvement in sales is expected to be driven by the recovery of motorcycle sales as rural and semi urban markets improve supported by healthy crop prices and incomes finally catching up with hike in vehicle prices and pent-up replacement demand. Scooter sales to be supported by robust urban incomes. Furthermore, premiumization to also aid volumes across both scooters and motorcycles. As FY25 is an election year, there is an anticipation of a rise in financial activity, particularly in rural areas, starting from the third quarter of FY24. This surge is projected to boost the demand for two-wheelers. Furthermore, the introduction of electric scooter models by OEMs is playing a significant role in driving up the demand even further.

However, despite the projected growth, the volumes in FY25 are still expected to remain lower than the peak achieved in FY19. The reason for this decline is attributed to significant price hikes recorded in the two-wheeler segment over the past few fiscal years, affecting both ownership and acquisition costs and subsequently dampening consumer sentiment. The acquisition price for an entry-level two-wheeler has surged by approximately 40-45% between FY19 and FY23 due to the implementation of safety norms, BS-VI compliance, and higher input costs.

In the medium to long term, we expect manufacturers to focus on expansion in distribution network in semi-urban and rural areas, new model launches in the 125cc segment for scooters and premium segment for motorcycles.

- Improving rural productivity, diversification towards horticultural crops, government income support schemes and structural measures taken by the government such as PM-KISAN, eNAM, Pradhan Mantri

Fasal Bima Yojna (PMFBY) to name a few, will aid rural income in the long run. This is expected to drive sales of motorcycle segment, which will be a primary beneficiary of the rural growth.

- Scooters are expected to witness higher penetration in the rural market driving growth. The consumer preference shifting towards higher 'cc' scooters (125cc) is also likely to aid demand. This is due to a ramp up seen in road construction over the last few years. However, EV penetration is going to eat up scooters market share in the long run.
- Mopeds, which account for 3-5% of domestic two-wheeler sales, are expected to decline. Shift in consumer preference towards other vehicle segments and EV penetration will act as key reasons impacting moped sales.

CRISIL MI&A Research expects domestic two-wheeler sales to record a compound annual growth rate (CAGR) of 7-9% from fiscal 2024 to fiscal 2029, after robust recovery in fiscal 2024.

**Commercial vehicles** (Steel intensity- high): The commercial vehicles (CV) industry exhibited a strong recovery in the fiscal year 2023, achieving a remarkable growth rate of 34%, albeit on a low base, and reaching 96% of the pre-pandemic levels observed in the fiscal year 2019. This resurgence can be attributed to pent-up replacement demand, improved transporter profitability, and pick-up in capex that had been hampered during the preceding 2-3 years due to economic stagnation and the disruptive impact of the pandemic.

In fiscal 2024, overall CV sales witnessed a marginal growth of 1% compared to the corresponding period of the previous year. Light Commercial vehicles (LCV) sales declined by 3% on the high base of fiscal 2023 primarily due to the lower utilization of the fleet. The higher tonnage sales led to flat growth in the Medium and Heavy Commercial Vehicles (MHCV) sales, and the busses segment grew by 21% due to the strong demand from the school and staff segments. The demand from the key end-user segments coupled with the pent-up replacement demand helped the industry to mark the growth and reached 0.98 times of pre-pandemic highs.

The CV sales for fiscal year 2025 are expected to remain flat, with sales ranging between (1)-1%. LCVs are expected to grow by 0-2% supported replacement demand, while MHCV sales are estimated to range between (1)-1% on account of high tonnage sold in MHCVs over the preceding years.

The MHCV industry is projected to record a CAGR of ~ 1-5% over the five years from fiscal year 2024 to fiscal year 2029, while LCV demand is expected to grow at ~ 2-6%

**Tractors** (Steel intensity- Medium): In FY24, domestic tractor sales declined by 7% on-year on account of lower reservoir levels and negative farmer sentiments. Negative farmer sentiments also impacted the festive demand, with sales in the festive months – September, October, and November – for fiscal 2024 - being lower by 6% on-year as compared to the same period last fiscal. Uneven rainfall distribution with monsoon being 6% below normal for the season has led to slower pick-up in the retail market. Barring north-west and central India, remaining regions reported deficit rainfall over normal impacting tractor demand.

In FY25, with IMD's (Indian Meteorological Department) prediction of a normal monsoon season, aiding farmer sentiments, domestic tractor sales are expected to grow by 2-4% on-year. An 8-10% on-year increase in volumes up for replacement to further support growth in the fiscal. Healthy rainfall is expected to lead to higher festive demand in the second and third quarters while healthy reservoir levels would also boost kharif acreage and thereby crop profitability which, in turn, is expected to aid tractors sales in the last quarter of the fiscal.

CRISIL MI&A Research projects domestic tractor sales to expand at 4-6% compounded annual growth rate (CAGR) during fiscals 2024 to 2029, after factoring in one to two years of erratic monsoon during the period along with healthy sales expected in the remaining years.

**Engineering, packaging, fabrication and others**

This segment comprises a wide range of end-use sectors such as general engineering, capital goods, consumer durables, electrical goods, industrial bodies, and fabrication. According to CRISIL MI&A Research estimates, the sectors account for 23-27% of total steel demand. Cumulatively, growth in steel demand from the sub-segment is estimated to have been ~10% in fiscal 2023, increasing to ~13% in fiscal 2024. For fiscal 2025, in line with the anticipated slowdown in the overall demand growth rate, demand from engineering, packaging and others will increase ~12-14%. Between fiscals 2025 and 2029, CRISIL MI&A Research projects steel demand form the segment to increase at CAGR of 8-10%.

# 5. Steel intermediate production in India

## 5.1 Pig iron

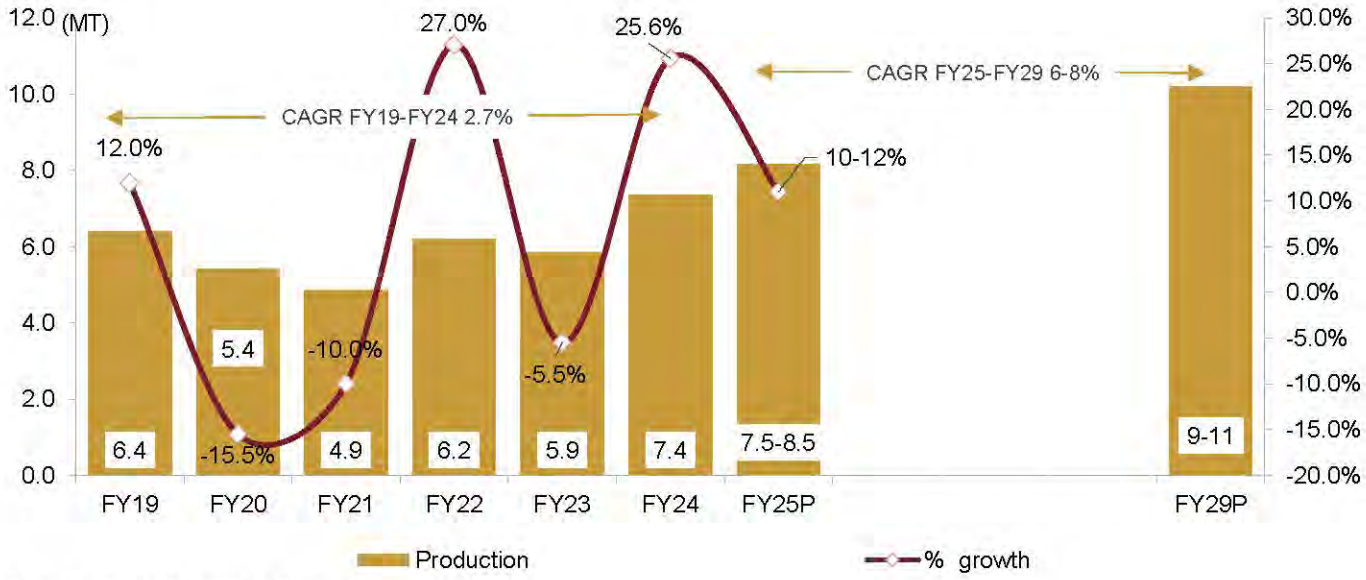
Pig iron is an intermediate obtained while smelting iron ore with a high-carbon fuel, such as coke or limestone, used as a flux (reducing agent) when making iron in a BF. Usually there are two grades of pig iron:

1. Steel grade pig iron used to make steel
2. Foundry grade pig iron, with a higher degree of silicon and better controlled carbon content used in foundries to produce castings and forgings

**Raw materials**

Iron ore, coking coal and fluxes such as limestone are key raw materials used to produce pig iron. Coke is the reducing agent, while fluxes remove impurities in the ore. Pig iron is manufactured via the BF route.

**Figure 18: Pig iron production and outlook (FY19-FY29P)**




*Source: JPC, CRISIL MI&A Research*

Pig iron production logged a muted CAGR of 2.8% between fiscals 2019 and 2024 despite robust growth rates recorded in fiscals 2022 and 2024 on a low base. In fiscals 2020, 2021 and 2023, the production declined on account of elevated and volatile coking coal costs, a key raw material used in pig iron production.

In fiscals 2020 and 2021, the production declined because of weak demand from both steel and casting segments coupled with a decline in its share in crude-steel blending mix by IF/EAF players. This can be attributed to a fall in demand from the castings industry (35-40% of pig iron end-use demand mix) especially from the automotive sector. If fiscal 2020, steel demand growth had moderated to 1.4% on-year and crude-steel production growth declined 1.5% on-year. As Covid-19 dampened steel production, demand from the castings segment remained weak in the first half of fiscal 2021. Healthy recovery was visible from October 2020 onwards with revival of the auto, real estate and construction and white goods sectors. Overall, pig iron production declined in fiscal 2021.

**Fiscal 2022:** Domestic pig iron production rose 18.1% on-year on a low base in fiscal 2022, with demand from the castings and steel industries growing in double digits in the second half of the fiscal. The conflict between Russia and Ukraine and sanctions imposed on the former opened doors for exports of pig iron in March, pushing up the prices. The sanctions led to supply-chain issues since Russia is the third-largest exporter of pig iron. Also, growth in the fiscal was optical because of low base in the previous fiscal owing to weak demand from the castings sector in the third and fourth quarters.

**Fiscal 2023**: Pig iron production fell 6.1% on-year to 5.86 MT despite a healthy 5.7% growth in crude-steel production owing to higher blending of scrap because of low prices and the slowdown in the EU, resulting in lower consumption of pig iron. Also, high input costs forced long-steel players to blend more substitute products such as scrap and sponge iron, which are of lower prices.

**Fiscal 2024**: Pig iron production touched an all-time high of 7.4 MT in fiscal 2024, up 26% on-year on a low base. New production capacities commissioned by NMDC (Nagarnar plant) and Bengal Energy supported the production growth. The growth was also driven by the steel sector which grew a healthy 13.2%. Also, lower coking coal costs, improvement in supply and weak global market conditions boosted pig iron production.

**Pig-iron production outlook (FY25P-FY28P)**

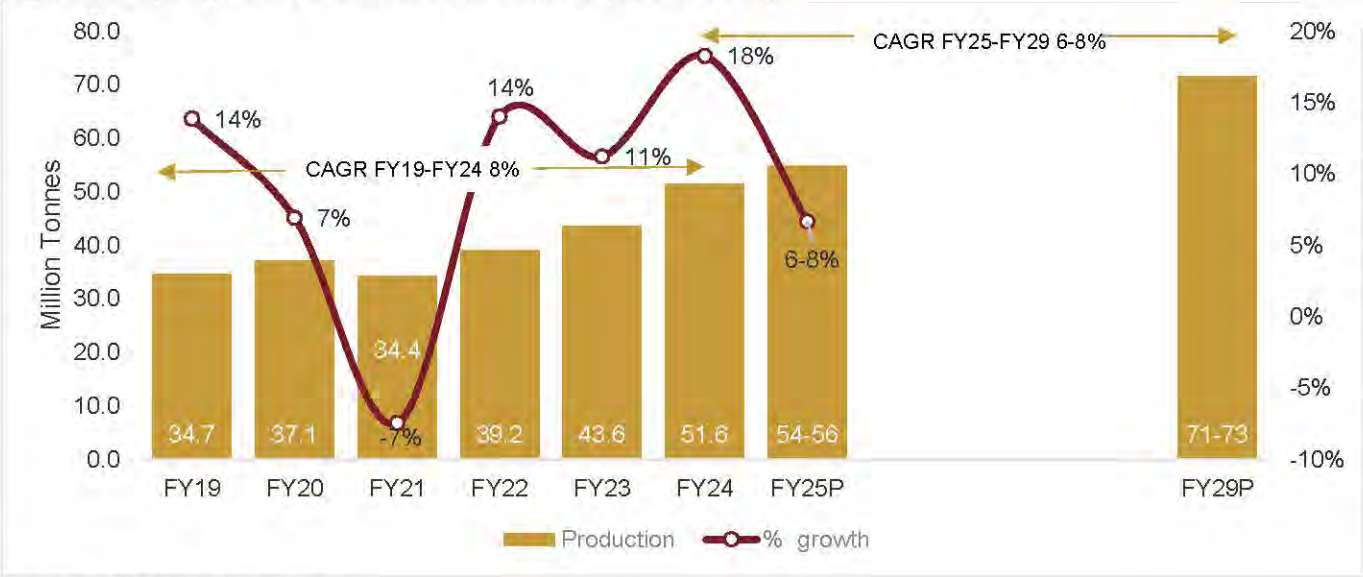
**Fiscal 2025 outlook:** The growth of the steel sector, a major driver for pig iron industry, is expected to moderate this fiscal on a high base of fiscal 2024. Further, growth in the castings sector is also expected to be average. These factors will impact pig-iron supply this fiscal. Overall production is set to grow by 10-12% supported by moderate crude-steel production growth of 3-4%. Another factor that will support pig iron production is a drop in coking coal cost. As the industry is fragmented and consists of small players, elevated coal costs have material impact on the production. Coking coal cost is expected to drop by ~20% this fiscal amid a rise in supply from Australian mines and moderation in Indian crude-steel production growth.

Between fiscals 2025 and 2029, we expect pig iron production to grow by a stable CAGR of 6-8%. The base effect is waning, and EAF/ IF players are easing the ramping up of capacities. Since no major capacities are expected in the EAF/ IF segment, growth for steel-grade pig iron would be weak in the medium term.

## 5.2 Sponge iron

Sponge iron (or DRI) is produced by reducing (removing oxygen) from iron ore to increase free iron content. This also makes the ore porous. Sponge iron is popularly used as a feed in EAFs/ IFs and as a substitute for steel scrap because high-quality scrap is costly and scarcely available. Integrated steel plants also use it as a coolant, again as a substitute to melting scrap. Sponge iron is of two types — coal-based and gas-based — based on the reducing agent (coal or natural gas) used to remove oxygen from the ore. Usually coal-based sponge iron account for 80% of the market share and gas-based sponge iron the balance. The key materials for this sector are natural gas, thermal coal and iron ore (fines/ pellets).

**Figure 19: Sponge iron production and outlook (FY19-FY29P)**




*Source: JPC, CRISIL MI&A Research*

Sponge iron production logged a healthy 8.2% CAGR between fiscals 2019 and 2024. The sector has been witnessing a consistent double-digit growth since fiscal 2021, when it had degrown owing to the pandemic-led slowdown. This growth can be attributed to healthy long-steel production driven by infrastructure and construction activities.

**Fiscal 2022:** Long-steel demand, a key marker for DRI, grew a healthy 9% on-year, spurred by offtake by key infrastructure projects and housing and real estate construction, which translated into a 13.5% rise on-year in sponge iron output to 39.09 MT on a low base.

**Fiscal 2023**: Sponge iron output touched 43.5 MT, a 11.1% on-year rise as a result of high long-steel demand of 65 MT (11% growth) driven by the allied sectors. Long-steel segment also benefitted from an 18% increase in the government's infrastructure capex for the fiscal. A 34% reduction in iron ore cost, brought on by the new tax regulations in May 2022, had boosted growth and profitability of the segment. However, this was offset by high thermal coal cost.

**Fiscal 2024**: Long-steel production touched 76.2 MT in fiscal 2024, up 13.8% on-year driven by robust infrastructure projects and healthy growth in allied sectors. In fiscal 2024, sponge iron production grew 18% to 51.5 MT supported by long-steel sector. Further, drop in thermal coal cost in the domestic and global markets supported the production growth.

**Sponge iron production outlook (FY25P-FY29P)**

**Fiscal 2025 outlook:** A moderation in long-steel demand growth to 7-9% on a high base is set to impact DRI production growth this fiscal. The output is expected to witness a moderate 6-8% growth on-year to 54-56 MT on a high base. Falling thermal coal prices and improved availability will support production. In Q1FY25, long-steel demand grew by 10% on year.

Between fiscals 2025 and 2029, long-steel demand is expected to grow by a CAGR of 6-8%. Lower EAF/IF crude steel production growth will moderate sponge iron output, with most of the capacity expansions expected in the BF/BOF stage.

# 6. Indian steel production, capacities and capacity utilisation

## 6.1 Crude steel production: Review and outlook

Crude steel is the first solid steel obtained from solidification of liquid steel.

As per provisional data released by JPC, Indian crude steel production in fiscal 2024 was 144.3 MT, up ~13.4% on year. Between fiscals 2019 and 2024, the country's finished steel production logged ~5% CAGR (including pandemic-hit fiscals 2020 and 2021). Robust demand from end-user segments supported production. Increased government spending on infrastructure and related sectors boosted domestic demand 13.7% in fiscal 2024.

In fiscal 2024, Indian crude steel production in the fiscal was 144.3 MT. Around 43% of it was produced through the BOF route, 35% through the IF route and around 22% by the EAF route.

Notably, in calendar year 2018, India had surpassed Japan to become the second largest crude steel producer in the world.

**Table 9: Capacity, production and utilisation**

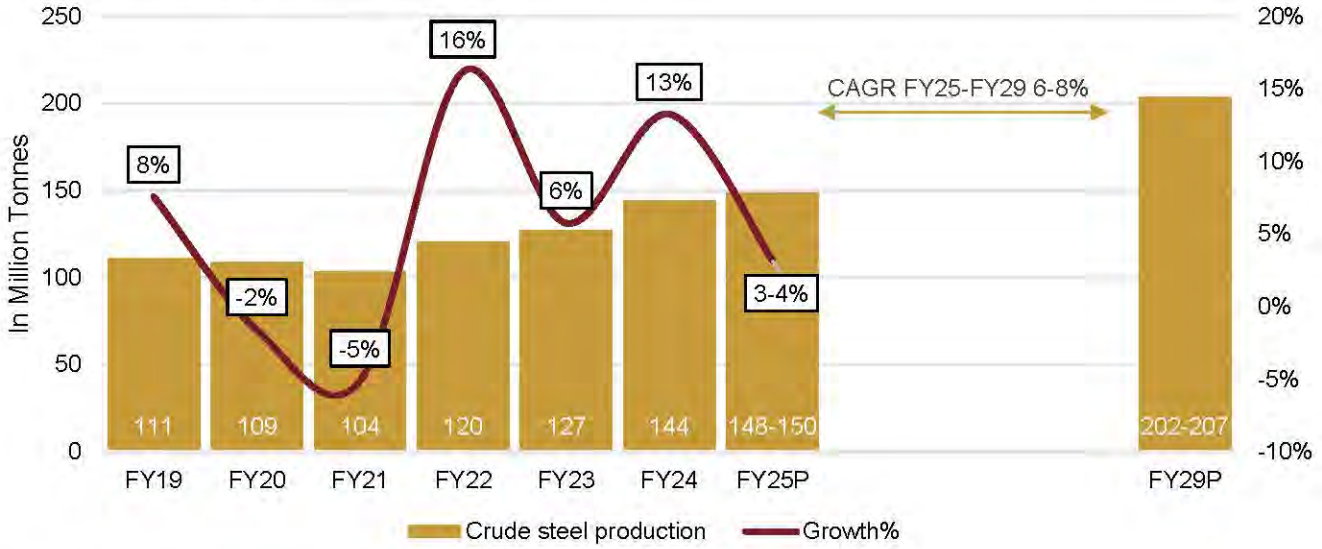
| MT | FY19 | FY20 | FY21 | FY22 | FY23 | FY24 |
|---|---|---|---|---|---|---|
| Crude steel capacity | 142.2 | 142.3 | 143.9 | 154.1 | 161.3 | 179.5 |
| Crude steel production | 110.9 | 109.1 | 103.5 | 120.3 | 127.2 | 144.3 |
| Capacity Utilisation | 78% | 77% | 72% | 78% | 79% | 80% |

*Source: JPC, CRISIL MI&A Research*

**Outlook:** As per the NSP 2017, by fiscal 2031 the country should have 300 MTPA steelmaking capacity to meet the domestic demand. Crude steel production is envisaged to reach more than 250 MTPA by then. Various steps are being taken to achieve the target. For instance, the government has made procurement of made in India steel mandatory for government projects. It also introduced Production Linked Incentive (PLI) scheme to boost specialty steel manufacturing. Apart from these, there are also other schemes such as PM Gati Shakti and Pradhan Mantri Awas Yojana (PMAY). According to the provisional data released by JPC, in fiscal 2024 domestic finished steel demand increased by 13.7% and crude steel production, 13.4% on-year.

As per CRISIL MI&A Research estimates, in fiscal 2025, crude steel production is expected to grow 3-4% on-year on a high base. To support the domestic demand, the country needs to add 65-70 MT capacity by fiscal 2029 to the capacity of 179.5 MT in fiscal 2024. Aligning with the domestic demand CAGR of 7-9% between fiscals 2025 and 2029, crude steel production is expected to log a CAGR of 6-8%. Government capex on infrastructure-related activities and demand from other allied sectors are likely to drive the demand.

**Figure 20: Crude steel production trend**




*Source: JPC, CRISIL MI&A Research*

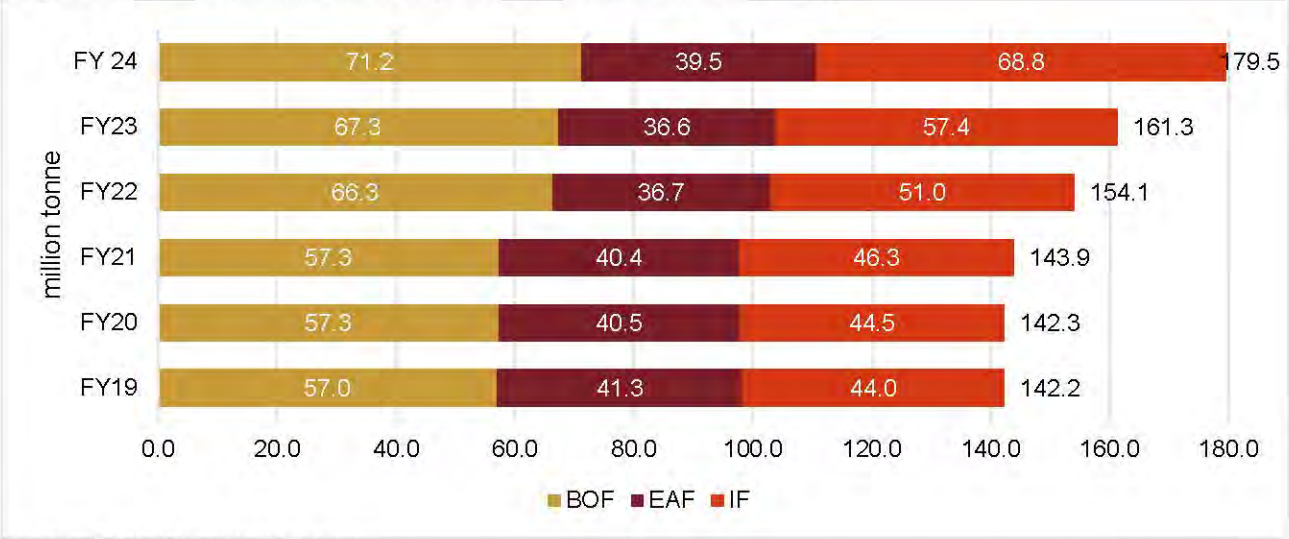
**Indian steelmaking capacity by production technology**

Domestic steel capacity has grown 18 MT from fiscal 2019 to fiscal 2023 to 161.3 MT. Capacity by the end of fiscal 2024 was around 179.5 MT.

Three types of technologies are used for making steel in India — BOF, EAF and IF. Around 42% of India's fiscal 2023 steel capacity was BOF, 23% EAF and the balance 36% IF.

As per the CRISIL MI&A Research estimates, the country will likely add 65-70 MT capacity between fiscal 2025 to fiscal 2029. Steel players are rapidly expanding given the robust demand in the domestic market. In the post-Covid period, rapid recovery owing to pent-up demand and increased government spending on infrastructure and related sectors led to three consecutive years of double-digit demand growth — 11.4% in fiscal 2022, 13.4% in fiscals 2023, and 13.7% in fiscal 2024. Between fiscals 2025 and 2029, the demand is expected to grow at 7-9% CAGR.

**Figure 21: Share of crude steel capacity by production technology**

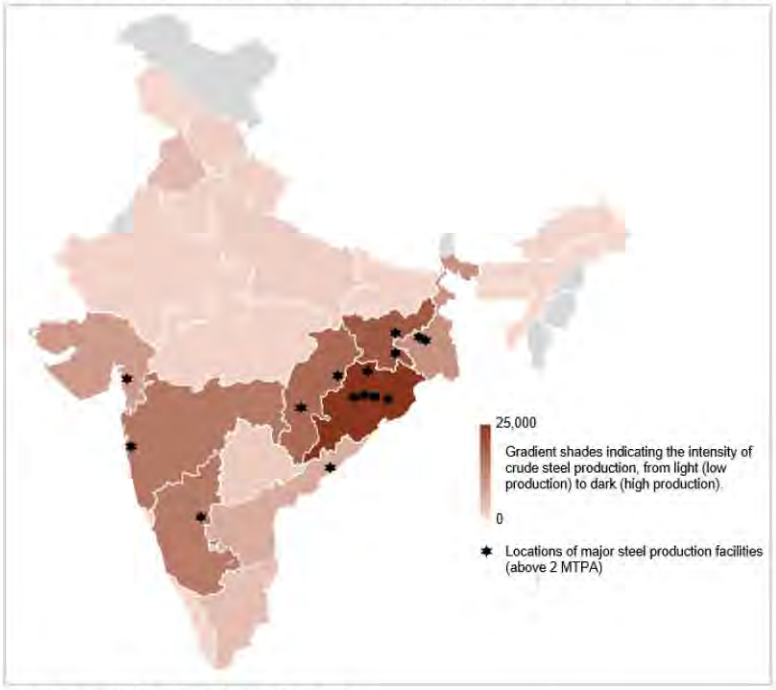



*Source: JPC, CRISIL MI&A Research*

**Steelmaking capacity by state**

The eastern and western regions have a higher share in steelmaking capacity. In the east, Odisha has the highest steelmaking capacity, of 25 MT (mostly BOF), followed by Jharkhand with 21 MT (mostly BOF). In the west, Chhattisgarh tops with a steelmaking capacity of 23 MT (mostly EAF), followed by Maharashtra with 18 MT (mostly IF). In the south, Karnataka is the biggest with 14 MT capacity followed by Andhra Pradesh with 10 MT. In the north, Punjab dominates with a capacity of 6 MT.

**Figure 22: Major steel producing states and production facilities in India**

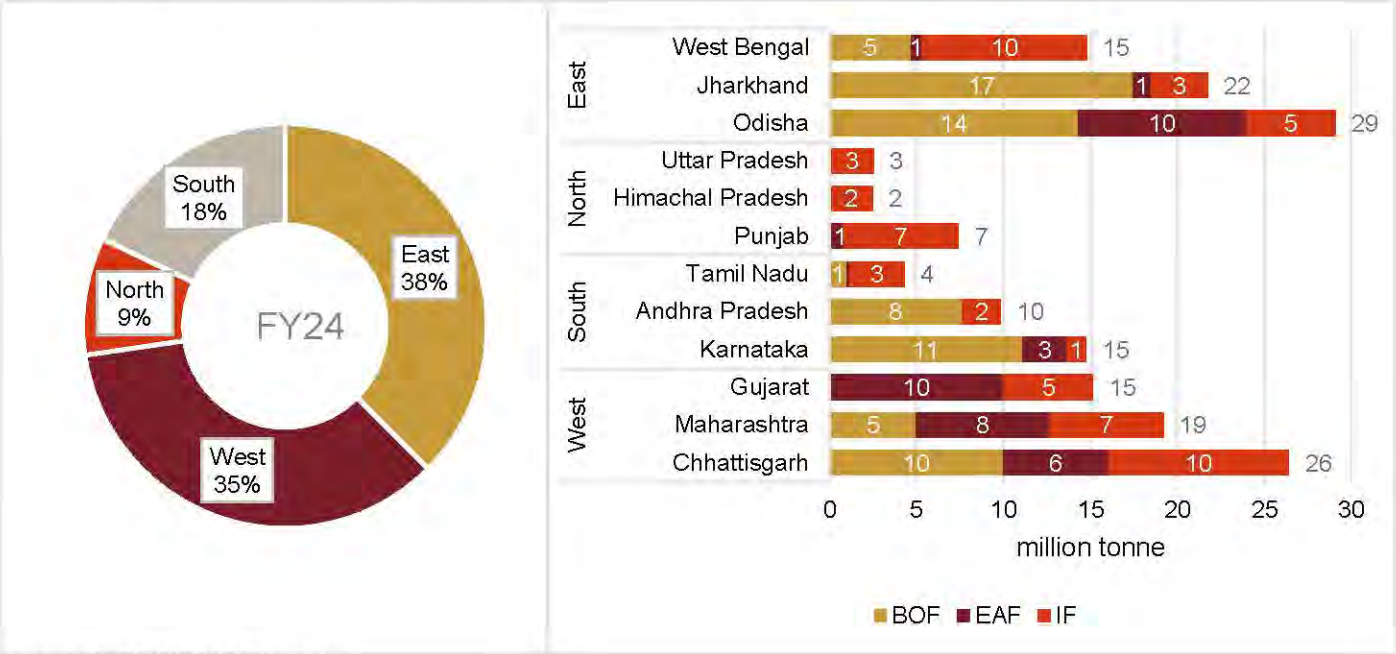



*Source: JPC, CRISIL MI&A Research*

*Note:*

1. *Indicative locations are marked only for major steel production facilities in India.*
2. *Map not to scale.*

**Figure 23: Region-wise steelmaking capacity**




*Source: JPC, CRISIL MI&A Research*

## 6.2 Capacity expansion by Indian steel Industry

Indian steelmakers have a robust pipeline of capacity expansion across the steel value chain. They have started sourcing the key ingredient for production, iron ore, domestically which is cheaper than imports. This has worked in favour steelmakers, who enjoy a price advantage. To realise this advantage, many steel mills have planned expansions through the BF-BOF route. Although, this will sustain India's dependence on coking coal imports, procuring or sourcing steel scrap would be a bigger challenge, which is more conducive for EAF-based steelmaking.

As India's demand for steel is increasing, its steelmaking capacity is also expanding. Major integrated players have undertaken both brownfield and greenfield projects to expand capacities. This is also in line with the target of achieving 300 MT of operational crude steel capacities by fiscal 2031 under the National Steel Policy (NSP) 2017.

**Capacity growth vs. demand growth**

Crude steel capacity over fiscals 2019-2023 logged 3.2% CAGR to reach 161 MT. By end-fiscal 2024, the capacity is estimated to have reached ~179.5 MT. This is expected to increase to 234 MT by fiscal 2028, clocking 7.8% CAGR.

Still, capacity additions will lag demand growth. Demand growth, which was higher than capacity growth over fiscals 2019-2024 (6.7% CAGR), is expected to continue to outpace capacity additions until fiscal 2029.

The domestic steel industry grew rapidly in 2000s. However, there was a significant decline in global steel demand after the Global Financial Crisis of 2008, which eventually led to global overcapacity and resulted in a significant price fall and generation of some non-performing assets (NPAs) in the industry.

The domestic steel sector's struggle with NPAs became particularly pronounced around fiscals 2013-2016 when global steel prices plummeted, and domestic overcapacity exacerbated financial stress. During this period, major steel companies such as Essar Steel and Bhushan Steel accounted for a significant portion of the sector's NPAs, reflecting the challenges of high operational costs and reduced market prices. It was at that time the government passed the Insolvency and Bankruptcy Code (IBC) to address and restructure the mounting bad debts of the banking sector. The law was aimed at streamlining debt resolutions and revitalise businesses by improving operational efficiencies and financial health. With the restructuring of the major steel NPAs and implementation of protective tariffs to shield domestic steel producers, the sector has seen gradual improvements in financial stability, paving the way for recovery and sustainable growth.

After their experience with high NPAs, steel makers have become more cautious about capacity expansions. Consequently, there was a notable slowdown in the pace of capacity additions between fiscals 2018 and 2021 — from 138 million tonne to 144 million tonne. The cautious approach prompted a more measured strategy towards growth to ensure financial sustainability and operational efficiency.

During this period, major players grew inorganically, strategically acquiring stressed assets, leading to a more concentrated industry landscape. The consolidation was facilitated by the IBC, which helped streamline the process of restructuring bad debts and enabled healthier steel companies to acquire underperforming ones. Notable acquisitions include Tata Steel's acquisition of Bhushan Steel Ltd and JSW Steel's acquisitions of Monnet Ispat and Bhushan Power and Steel Ltd (BPSL). Additionally, the acquisition of Essar Steel by ArcelorMittal Nippon Steel JV marked a significant reshaping of the industry, with major global players entering the Indian market. These moves not only helped stabilise the industry by reducing excess capacity but also allowed dominant companies to leverage economies of scale and improve competitive positioning both domestically and globally.

## 6.3 Finished steel production

### 6.3.1 Review and outlook

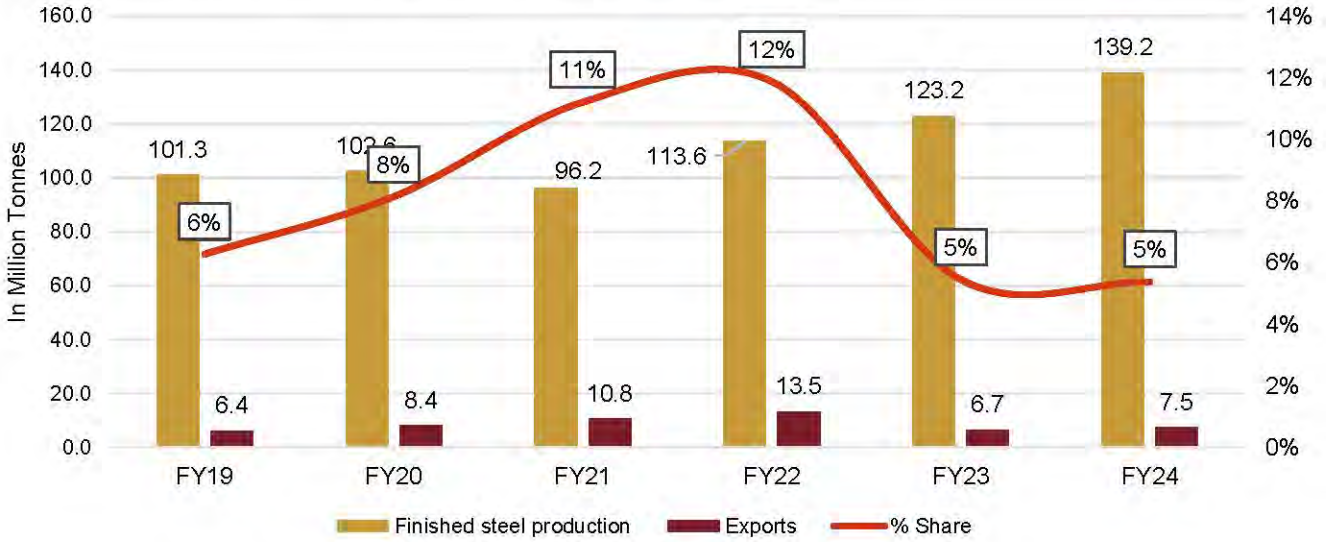
According to the Union Ministry of Steel, finished steel products are obtained after hot rolling/ forging of semi-finished steel (booms/ billets/ slabs). Finished steel products are classified into non-flat and flat products.

As per data released by JPC, Indian finished steel production in fiscal 2024 was 139.15 MT. Between fiscals 2019 and 2024, the country's finished steel production logged ~7% CAGR (including pandemic-hit fiscals 2020 and 2021).

Robust demand from end-user segments supported production. Increased government spending on infrastructure and related sectors boosted domestic demand 13.7% in fiscal 2024. Finished steel production grew 13% on-year. With the share of exports on the lower side, domestic demand has played a vital role in driving production.

Apart from domestic consumption, a small portion of the finished steel produced is also exported, mostly flat products.

**Figure 24: Finished steel production and exports in percentage terms**

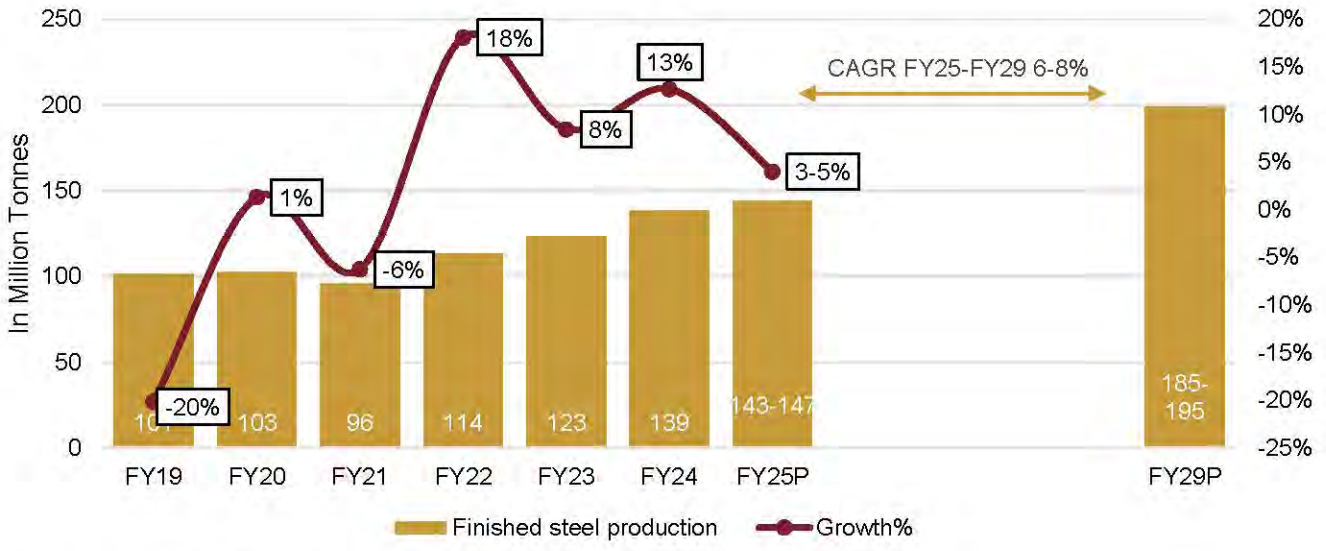



*Source: JPC, CRISIL MI&A Research*

**Outlook:**

CRISIL MI&A Research expects finished steel production to log 6-8% CAGR between fiscals 2025 and 2028, with support from the allied sectors in the domestic market and government spending.

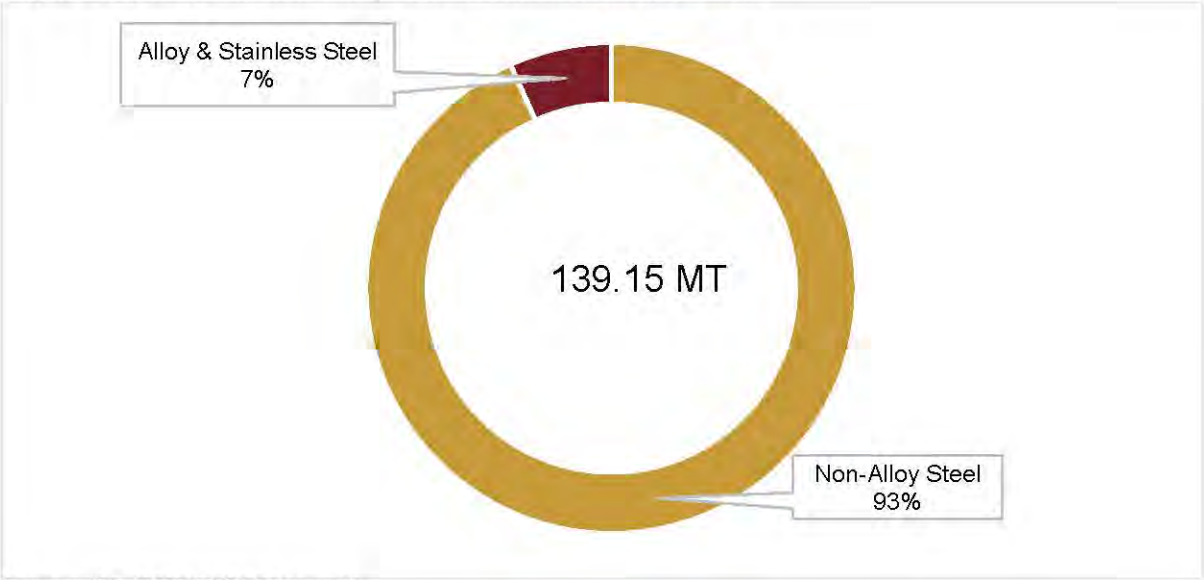
**Figure 24: Finished steel production trend**




*Source: JPC, CRISIL MI&A Research*

### 6.3.1.1 Alloy and non-alloy mix in domestic production

**Figure 25: Alloy and non-alloy steel production in fiscal 2024**

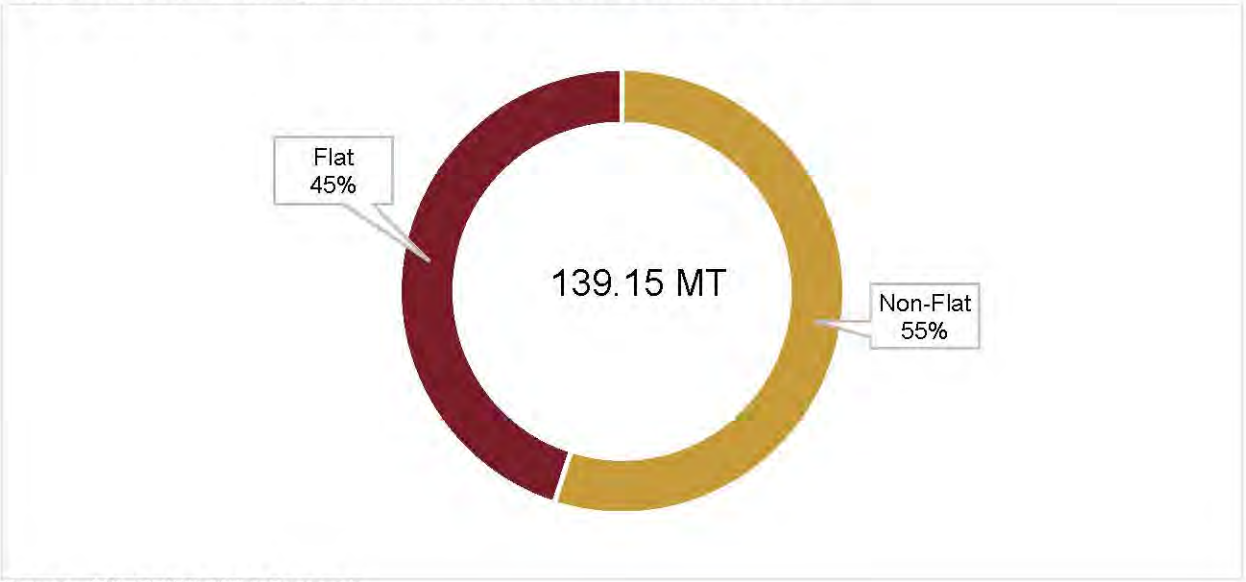



*Source: JPC, CRISIL MI&A Research*

The non-alloy segment accounted for ~93% of the finished steel production in fiscal 2024. The balance 7% was in the alloy and stainless-steel segments. The share of the non-alloy segment remained high, at ~94% on average between fiscals 2019 and 2024.

### 6.3.1.2 Non-flat and flat-steel mix in domestic production

**Figure 25: Non-flat (long) and flat steel production in fiscal 2024**

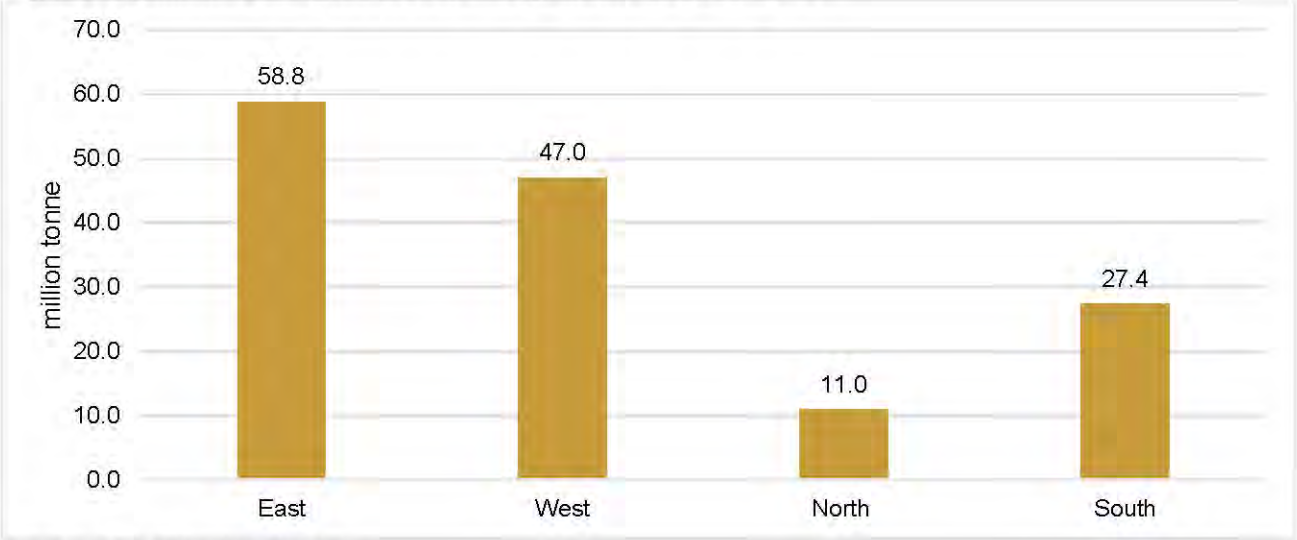



*Source: JPC, CRISIL MI&A Research*

In fiscal 2024, ~55% of the finished steel produced in India was non-flat steel and the balance ~45% was flat. The share of the non-flat segment remained at ~52% on average between fiscals 2019 and 2024.

### 6.3.1.3 Region-wise finished steel production

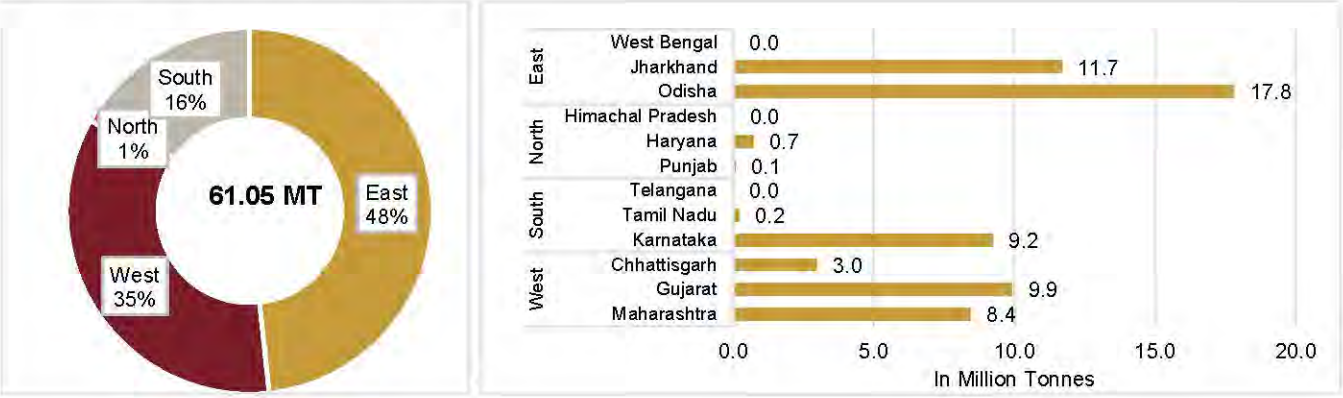
**Figure 26: Finished steel production — region-wise in fiscal 2024**




*Source: JPC, CRISIL MI&A Research*

In fiscal 2024, the eastern region accounted for 41% of the total domestic finished steel production. It was followed by the west (33%), south (19%) and the north.

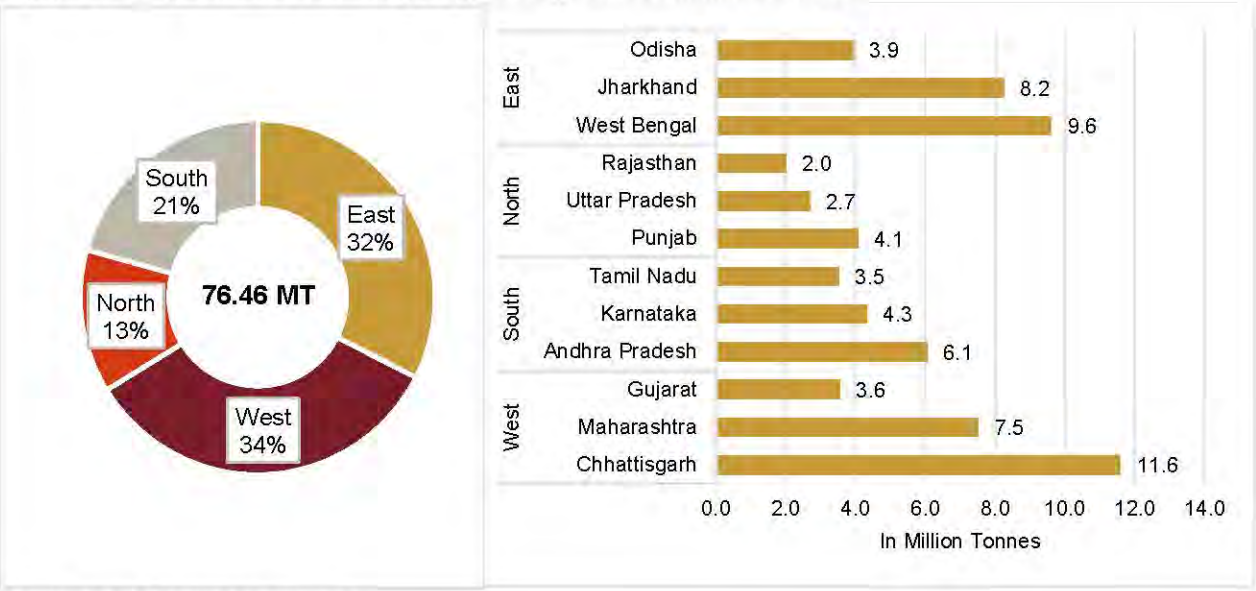
**Figure 27: Region-wise flat steel production**




*Source: JPC, CRISIL MI&A Research*

In flat-steel production, the eastern region dominated with 29.5 MT in fiscal 2024. It was followed by the western region (21.3 MT). Among the states, Odisha was the top producer, followed by Jharkhand in the eastern region, Karnataka in the southern region and Maharashtra and Gujarat in the western region.

**Figure 28: Region-wise non-flat (long) steel production in fiscal 2024**




*Source: JPC, CRISIL MI&A Research*

In non-flat products, the western region dominated, producing 22.7 MT in fiscal 2024, followed by the eastern region, producing 21.8 MT. Among the states, Chhattisgarh was the top non-flat-steel producer, followed by Maharashtra in the west. In the east, West Bengal followed by Jharkhand were the major producers during the fiscal.

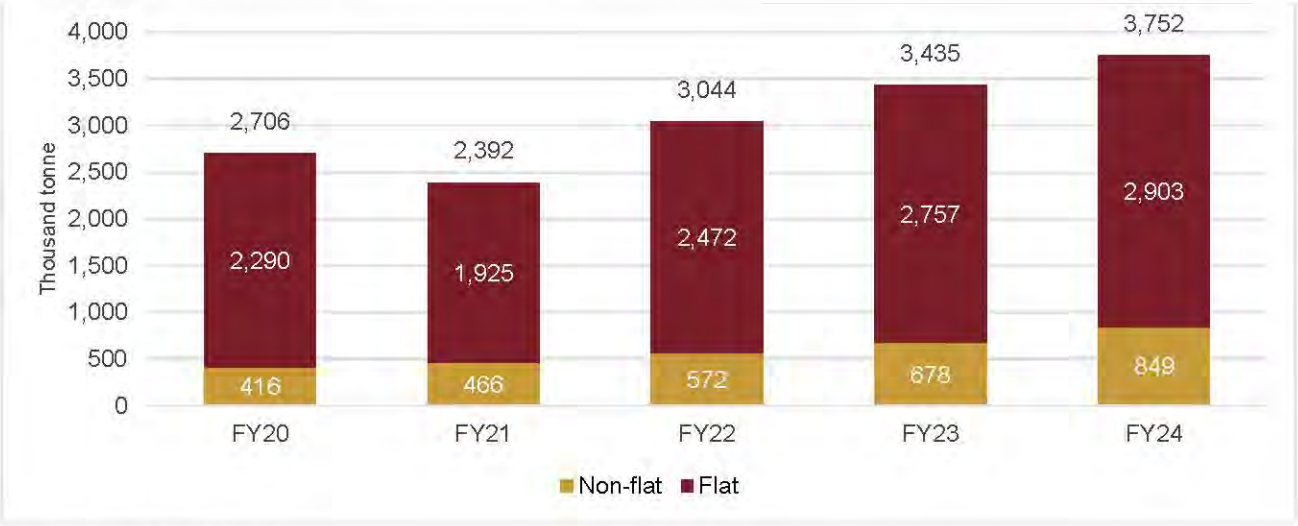
### 6.3.2 Stainless steel

Stainless steel has emerged as metal of choice owing to its characteristics, such as good strength to weight ratio, aesthetics, hygiene (it offers), resistance at high temperatures and recyclability. These properties enable its application across several end-use industries such as architecture, building and construction (ABC), automobiles, railways, transport (ART), consumer durables and process industries.

The stainless-steel industry in India has a healthy mix of large and mid -sized corporates, including public sector and micro, small and medium enterprises (MSMEs), spread across the country. India has an installed capacity of 7-7.5 million tonne (MT) of stainless steel with capability to produce a wide range of products as per national and international standards. The stainless-steel market has grown significantly in recent years and has promising prospects for the future.

Domestic demand for stainless steel (flat and long) clocked a compound annual growth rate of about 8.5% over fiscals 2020-2024 to reach 3.7 MT.

**Figure 29: Stainless steel apparent consumption in India**




*Source: JPC, CRISIL MI&A Research*

In terms of production, in fiscal 2024, India produced 3.4 MT of stainless steel and net imports were 0.4 MT. The segment can be further bifurcated to flat steel and long steel. In terms of non-flat steel (long steel). Although on a low base consumption of long stainless-steel products grew by 19.5 between fiscal 2020 and 2024

**Figure 30: Stainless steel non-flat (long product) apparent consumption growth**


*Source: JPC, CRISIL MI&A Research*

Stainless steel production facilities are predominantly located in the Northern, Western and Eastern region. In the Southern states there is only one major stainless steel manufacturing facility owned by SAIL, focusing on flat product manufacturing. There are no major producer of stainless steel long products in the southern states (Andhra Pradesh, Karnataka, Tamil Nadu, Kerala, Telangana). Any new entrant in the stainless steel - long steel segment, in the southern region will benefit from lower competition and the availability of end-of-life stainless steel scrap availability in the region.

# 7. Import and export of steel

Majority of the steel produced in India is domestically consumed. Except in fiscals 2021 and 2022, wherein global supply was impacted because of the pandemic, India exported only 6-7% of finished steel production, annually, over the past five fiscals. Also, while lockdowns were gradually relaxed in most economies, China, which accounted for ~50% of global production, continued to implement strict lockdowns in major cities, leading to a global supply deficit. Indian steel mills benefited. Finished steel exports increased 29% on-year in fiscal 2021 to 10.8 MT, rising a further 25% on-year in fiscal 2022 to 13.5 MT. In contrast, imports declined 30% on-year in fiscal 2021 to 4.7 MT, and a further 1.8% on-year in fiscal 2022.

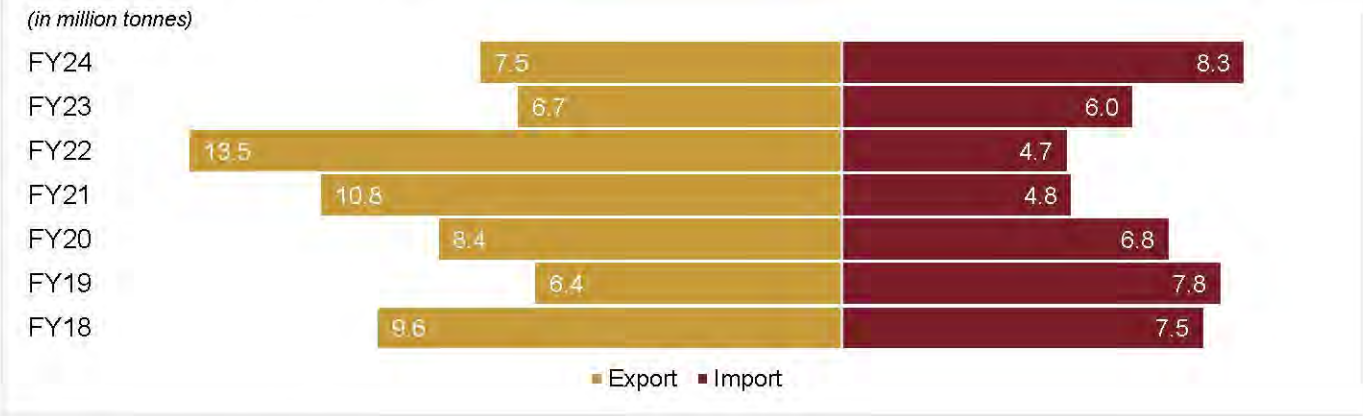
In fiscal 2023, geopolitical concerns in Europe increased steel prices within a short period. To control price volatility, the Indian government imposed an export duty on steel and its raw material. The measure lowered domestic steel prices, with exports declining 50% on-year to 6.7 MT. Still, global steel prices fell sharper than domestic prices owing to China's real estate market being in recession, Europe and other steel-consuming economies facing inflationary headwinds, and declining steel demand globally.

In contrast, India's steel demand continued to rise, which increased imports 29% on-year to 6 MT. In fact, India was a net exporter of steel over the past five fiscals, except in fiscal 2024, wherein India imported 8.3 MT of finished steel, up 38.2% on-year, and exported 7.5 MT of finished steel, up 11.5% on-year.

Robust demand from end-consumer industries absorbed the price hikes from domestic mills. This translated into domestic steel prices trading at a premium to global prices, thereby improving trader margin on imported steel. At the same time, steel mills focused on the domestic market instead of exports because of better realisation opportunities. As a result, export volume plunged ~72% on-year in September and ~31% on-year in November, eventually reversing in the fourth quarter as domestic prices cooled.

Also, to promote India as a 'value-added' steel-exporting country, reduce dependency on specialty steel imports, and in line with the NSP, 2017, the government launched the PLI scheme for the steel sector, with a budgetary outlay of Rs 6,322 crore as incentives. This scheme will benefit integrated steel producers as well as micro, small and medium enterprises. To be sure, the scheme is expected to attract an additional investment of Rs 39,600 crore for setting up of new plants for production of specialty steel, which has the potential to lead to an additional capacity of ~25 MT in downstream steel manufacturing in the country.

**Figure 29: Finished steel export-import trend**

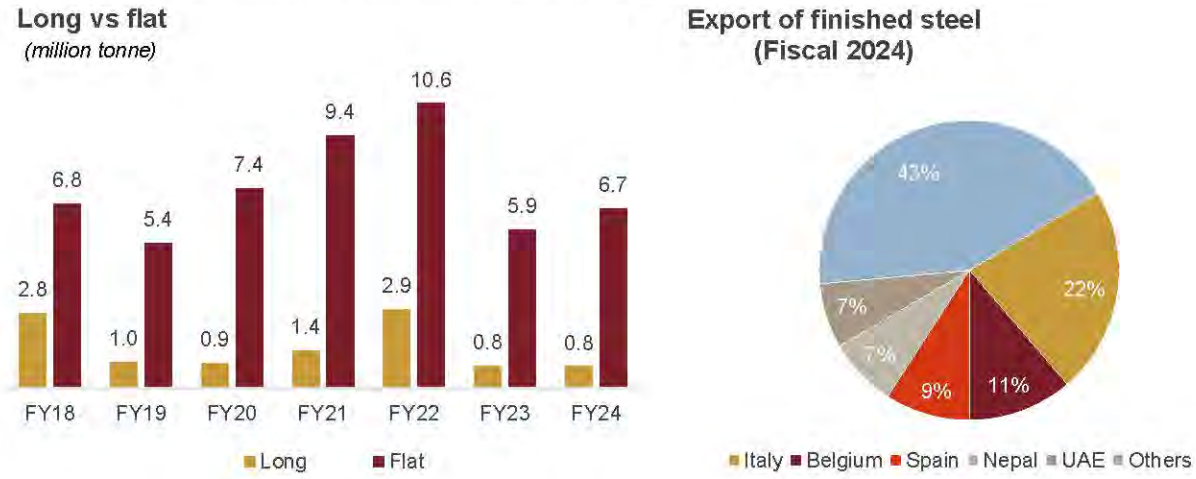



*Source: JPC, CRISIL MI&A Research*

## 7.1 Export of iron and steel products

**Finished steel**

**Figure 30: Distribution of steel products exports**




*Source: JPC, CRISIL MI&A Research*

As per JPC, in fiscal 2024, India exported 7.5 MT of finished steel. Of the total exports, ~89% was in the flat segment and ~11% in the long segment. The average share for the past five fiscals, i.e., fiscal 2020 to fiscal 2024 for the long segment, was ~14%, majorly skewed by an increase in fiscal 2022 to ~22% due to pandemic-induced lockdowns in east Asian nations.

In terms of chemical composition, India's steel export bucket comprised 8-9% alloy steel, while the rest was non-alloy steel. The average share for the past five fiscals for the alloy segment was ~12%, skewed by the fiscal 2022 trade, wherein alloy had ~33% share.

In terms of region, Europe remains the largest export destination for India, with Italy, Belgium and Spain (EU-27 countries) accounting for ~43% share of total exports, followed by Nepal (7%) and the UAE (7%).

In terms of product-wise bifurcation, ~37% of the exported finished steel was HR coils and strips; ~20% GP/GC steel; ~6% bars and rods; ~9% and ~7% alloys+stainless steel and CR coils and sheets, respectively; and the remaining ~21% comprising multiple categories. Bulk of the export to Italy (~56%) was of HR coils and strips, ~21% GP/GC, ~10% CR coils and sheets, and the rest ~13% various product categories, such as bars and rods, plates, pipes, etc.

Going forward, imposition of trade and traffic barriers by importing countries to promote the adoption of greener steel production methods and protection against cheaper imports remain key monitorable. The EU has implemented the Carbon Border Adjustment Mechanism, which will increase the cost of exports to Europe.

**Sponge iron and pellets**

Most of the sponge iron produced in India is consumed domestically. However, a small portion is exported to neighbouring countries. Of the 51.5 MT of sponge iron produced in fiscal 2024, only 1.3 MT was exported. This translates into 2.5% of total production. Over the past five fiscals as well, average exports as a percentage of

production were a mere ~2.2%. Nepal and Bangladesh are the key destination countries for sponge iron, accounting for ~85% share of India's exports. In value terms, total exports were Rs 3,899.8 crore.

**Figure 31: Sponge iron exports**

*(Million tonne)*

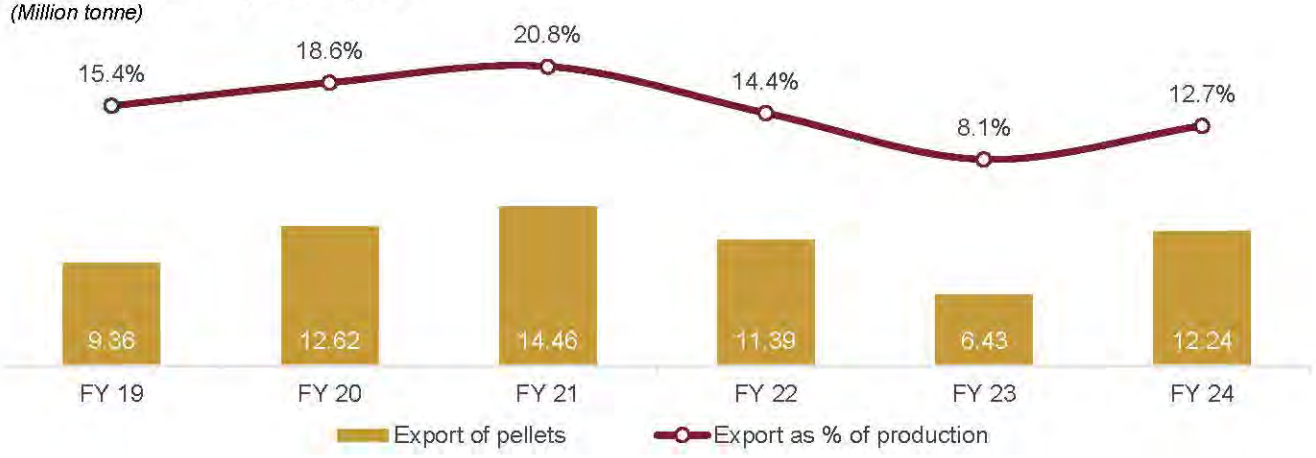

*Source: JPC, CRISIL MI&A Research*

To be sure, India has considerable iron ore reserves, with current production of iron ore and pellets not only supporting domestic players, but some portion also exported. In fiscal 2024 (provisional), exports reached 12.1 MT, which was 12.9% share of total domestic pellet production. Over the past five fiscals, average exports as a percentage of total production were ~15%. This included a high of 18.6% and 20.8% in fiscals 2020 and 2021, respectively, owing to Covid-induced global supply deficit, and lows of 8.1% in fiscal 2023 because of the imposition of export duty on steel and its raw materials between May 2022 and November 2022.

China is the largest export market of Indian pellets, comprising ~86% share of total exports in fiscal 2024. Southeast Asian and European markets accounted for the remaining 14% share.

**Figure 32: Iron ore pellet exports**

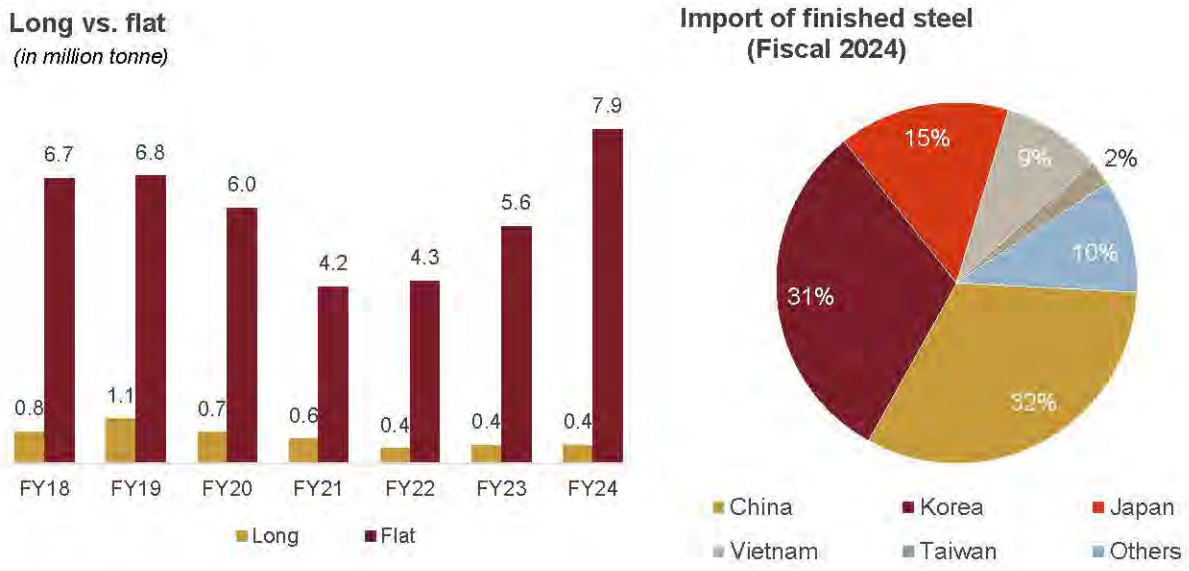
*(Million tonne)*




*Source: JPC, CRISIL MI&A Research*

## 7.2 Import of iron and steel products

**Figure 33: Finished steel Imports**




*Source: JPC, CRISIL MI&A Research*

While domestic steel mills mainly cater to domestic demand, certain grades require to be imported. With Indian mills increasing capacity in the current decade and support from the PLI scheme for steel, the reliance of import on such specialty steel is expected to decline gradually. In fiscal 2024, India is estimated to have imported ~8.3 MT of finished steel.

The ~38% increase in imports in fiscal 2024 can be attributed to 2.3 MT of incremental flat steel imports. In terms of chemical composition, India's import bucket comprised 25.5% alloy steel, with the rest accounting for non-alloy steel. The average share of alloy segment over the past five fiscals was 33%.

Flat steel comprised 95% share, with the long segment accounting for only ~5%. The average share of the long segment between fiscals 2020 and 2024 was ~9%.

Under region-wise imports, China was the largest exporter of finished steel to India in fiscals 2022 and 2023. The trend changed in fiscal 2024, though. In China, lukewarm domestic steel demand forced mills to explore export opportunities, leading to a significant jump in finished steel exports from China to India, which increased 91% on-year, thereby becoming the largest exporter to India. Imports from Japan and Vietnam also increased ~51% and ~130%, respectively, with imports from South Korea rising only ~17%.

Product-wise, ~36% of the imported finished steel was HR coils and strips, ~26% alloys and stainless steel, ~11.5% GP/GC, ~8% plates, ~4% CR coils and sheets, ~4% electrical sheets and the remaining accounting for ~10.5% of multiple categories, such as pipes, and bars and rods. China accounted for bulk of the imports, with alloy and stainless-steel comprising ~33% share, HR coils and strips ~24% and GP/GC coated steel CR coils being ~13%. Imports from South Korea were majorly HR coils and strips, accounting for ~42% of the finished steel imports, while the share for alloy and stainless steel, and GP/GC coated stood at ~23% and ~18%, respectively.

The increase in India's steel imports is because of other major economies reeling under the pressure of inflation, elevated interest rates, sanction-related trade flow issues and slowing demand. In fact, India has posted double digit growth in imports for three consecutive years. Although the quantity imported with regards to the total

domestic consumption is significantly low, competitive imports has led to softening of prices, thereby impacting Indian mills.

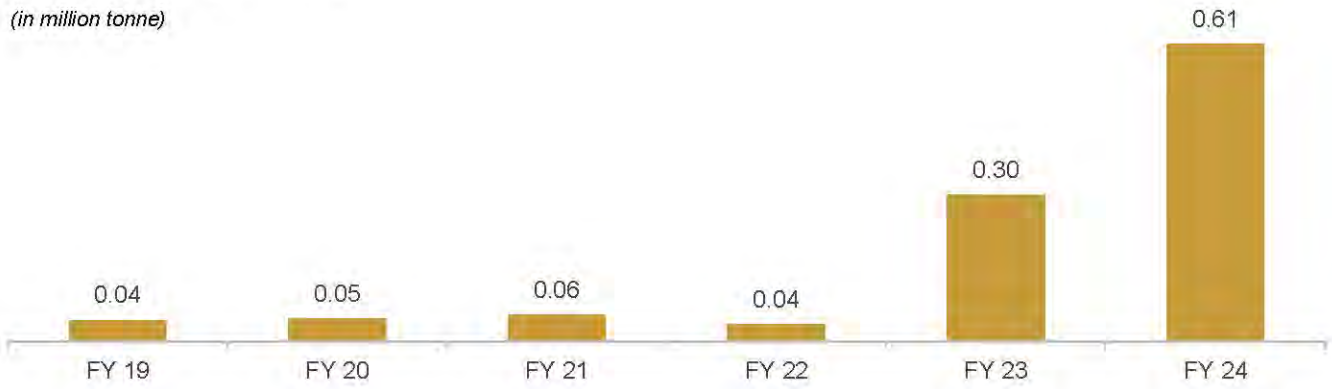
**Sponge iron and pellets**

Sponge iron and pellet imports comprise a minimal share. In fiscal 2024, the jump in the overall imports reaching 0.6 MT was majorly from Russia. India imported 0.5 MT of sponge iron from Russia in fiscal 2024, which was nil in fiscal 2023. Regular trade partners of India for sponge iron imports are South Africa and Middle East countries, such as Oman, Bahrain and the UAE.

**India has not imported pellets in the past two fiscals**

**Figure 34: Sponge iron import**

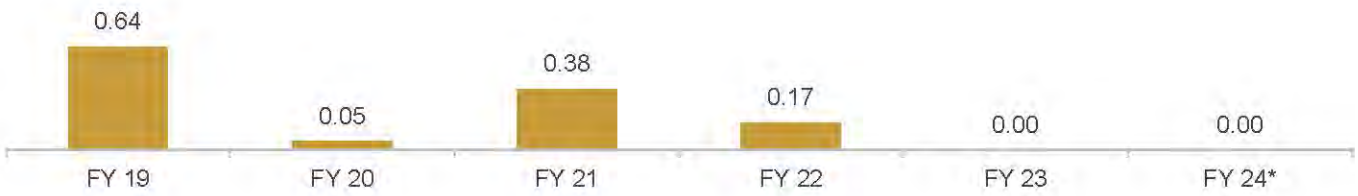
*(in million tonne)*




*Source: JPC, CRISIL MI&A Research*

**Figure 35: Import of pellets**

*(in million tonne)*




*Source: JPC, CRISIL MI&A Research*

# 8. Steel and raw material prices

Steel is one of the most vital commodities in the global economy, serving as the backbone for construction, infrastructure, manufacturing, and other key industries. Over the years, the prices of steel and its raw materials—such as iron ore, coking coal, and thermal coal—have been highly volatile, influenced by a wide range of factors. Understanding the dynamics behind these fluctuations is essential for stakeholders to anticipate trends, manage risks, and make informed decisions. The factors driving these price changes are complex and interconnected, making the steel industry particularly sensitive to global developments.

One of the most significant influences on steel and raw material prices is the state of the global economy. Periods of economic expansion fuel demand for steel as construction and industrial production increase, leading to higher prices for steel and its raw materials. However, during times of economic recession, such as the 2008 financial crisis or the global COVID-19 pandemic in 2020, demand for steel decreases sharply, causing prices to drop. Global demand and production capacity are constantly shifting, and steel markets are particularly sensitive to these changes in economic activity.

Supply chain disruptions also play a critical role in influencing the price of steel and its raw materials. Natural disasters, geopolitical conflicts, and logistical bottlenecks can severely impact the availability of raw materials like iron ore and coking coal. For instance, the Vale dam disaster in Brazil in 2019 disrupted iron ore supply, while floods in Australia have often affected coal exports, causing significant price spikes. Such disruptions can ripple through global markets, affecting supply and price stability for steel manufacturers worldwide.

Geopolitical factors further complicate pricing trends. Trade wars, tariffs, and sanctions can alter the flow of raw materials and finished steel products. For example, China's informal ban on Australian coal in 2021 disrupted supply chains and contributed to price volatility. Similarly, the Russia-Ukraine conflict in 2022 led to major disruptions in global energy markets and raw material supply routes, significantly affecting steel production costs and prices.

The availability of raw materials is another important driver of price movements. Major iron ore and coal-producing countries such as Australia, Brazil, and Indonesia play a critical role in determining global supply. Any disruptions in these regions, whether due to environmental, political, or logistical factors, can lead to supply constraints and drive up prices. Additionally, the emergence of new markets and producers can shift the balance of global supply and demand, further affecting price trends.

Emerging economies like China, India, and Southeast Asian nations have become key consumers of steel as they continue to urbanize and invest in infrastructure. Their large-scale infrastructure projects and industrial growth have led to increased demand for steel, which in turn raises the demand for raw materials like iron ore and coal. As these economies continue to develop, their demand for steel will remain a major driver of global prices, particularly for long steel products used in construction and industrial applications.

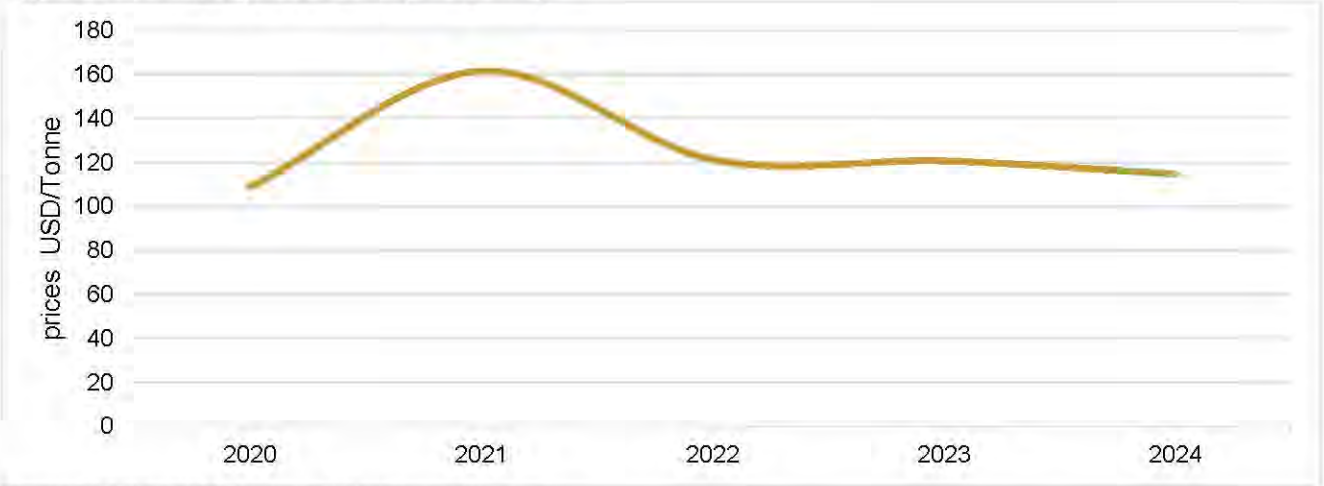
Government policies and environmental regulations are becoming increasingly influential in shaping the steel industry's future. The global push towards decarbonization, especially in developed markets like Europe and China, is leading to changes in steel production methods. These efforts to produce greener steel are expected to impact demand for traditional raw materials, such as coking coal, while raising production costs, which may be passed on to consumers. At the same time, government infrastructure initiatives continue to bolster demand for steel, balancing out some of the cost pressures from environmental regulations.

The overall volatility of global commodity markets, including fluctuations in iron ore, coal, and scrap steel prices, adds another layer of complexity to steel price movements. Global supply and demand shifts, speculative trading,

and currency fluctuations contribute to this volatility, making it difficult to predict price trends with accuracy. As the steel industry becomes more integrated into the global economy, it remains highly sensitive to changes in the broader commodity markets.

## 8.1 Iron ore prices

**Figure 36: Iron ore price trends (CIF China)**




*Source: CRSISL MI&A Research, 2024 prices are estimates*

2019: In 2019, iron ore prices surged due to significant supply disruptions. The dam disaster at Vale's Brumadinho mine in Brazil early in the year resulted in a sharp drop in iron ore exports, reducing global supply. Coupled with strong demand from China's steel industry, this pushed prices up. Prices reached nearly $120 per ton by mid-2019, marking a significant rise from around $70 per ton at the beginning of the year.

2020: The COVID-19 pandemic severely impacted the global economy in 2020. In the early months, iron ore prices fell as demand for steel slowed due to lockdowns and halted construction projects. However, prices rebounded sharply in the second half of the year. China's rapid recovery and infrastructure stimulus, along with supply constraints from Brazil, pushed prices to new heights. By December 2020, prices were around $150 per ton, a significant increase from the mid-year lows.

2021: Iron ore prices reached record highs in 2021, peaking at around $230 per ton in May. This was driven by strong demand from China, which was undergoing a construction and infrastructure boom. However, the second half of the year saw a sharp decline in prices as China introduced steel production curbs to meet its environmental goals and manage energy consumption. Prices fell to around $100 per ton by the end of the year due to these restrictions and an easing of supply concerns.

2022: In 2022, iron ore prices remained volatile. The first half of the year saw a recovery in prices to around $150 per ton, driven by global supply chain disruptions caused by the Russia-Ukraine conflict. However, slowing global growth and reduced demand from China, especially in real estate and construction, caused prices to fall again. By the end of 2022, prices stabilized around $90 to $100 per ton. China's COVID-19 policies, including lockdowns, further contributed to weak demand.

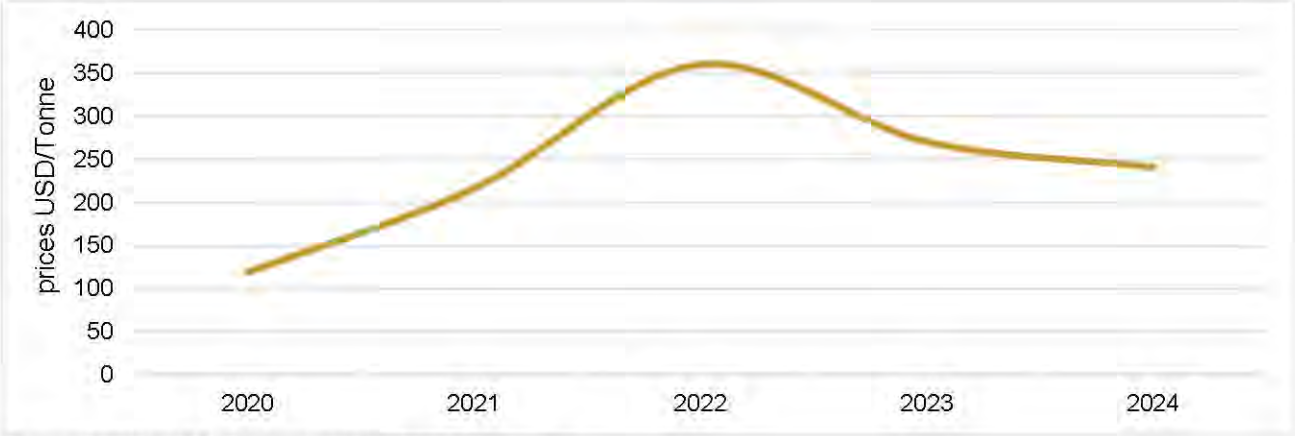
2023: Iron ore prices in 2023 saw some recovery, but global economic uncertainty limited gains. The reopening of China's economy post-COVID lockdowns, and stimulus measures targeting infrastructure, spurred moderate demand growth. Prices hovered around $110 to $130 per ton throughout the year. However, challenges such as

global inflation, slower-than-expected economic growth in Europe, and high energy prices limited the upside for iron ore demand.

2024: In 2024, iron ore prices are expected to remain steady but face downward pressure due to ongoing economic challenges and a potential slowdown in global steel demand. Environmental regulations and a shift towards decarbonization in steel production, particularly in Europe and China, are expected to weigh on iron ore demand. Additionally, increased investments in alternative materials like scrap steel and recycling may reduce demand for primary iron ore, keeping prices in the range of $90 to $120 per ton.

## 8.2 Coking coal prices

**Figure 37: Coking coal price trends (FOB Australia, PLVHCC)**




*Source: CRSISL MI&A Research, 2024 prices are estimates*

2019: Coking coal prices in 2019 were relatively stable, averaging around $180 to $200 per ton. The demand for coking coal remained strong, driven primarily by steel production in China and India. Supply was also steady, with key exporters like Australia maintaining output. However, disruptions due to weather conditions in Australia's mining regions occasionally pushed prices higher throughout the year.

2020: The onset of the COVID-19 pandemic led to a sharp drop in coking coal prices in the first half of 2020. Prices fell to around $110 per ton as steel production slowed, especially in Europe and North America, due to lockdowns and reduced construction activity. However, similar to iron ore, demand rebounded in the second half of the year as China ramped up steel production as part of its infrastructure stimulus. Coking coal prices recovered to around $150 per ton by the end of the year.

2021: Coking coal prices experienced significant volatility in 2021, largely driven by geopolitical tensions and supply chain disruptions. Prices surged in the second half of the year, peaking at over $400 per ton. This spike was largely due to supply disruptions in Australia, caused by severe weather events, and China's unofficial ban on Australian coal, which led to a supply crunch. China began sourcing coking coal from alternative suppliers like Mongolia, but logistical challenges increased prices further. By year-end, prices remained high due to continued supply tightness and strong demand for steel.

2022: In 2022, coking coal prices continued to fluctuate but remained elevated due to global geopolitical tensions, particularly the Russia-Ukraine conflict. Russia is a significant supplier of coking coal to Europe, and the conflict led to supply disruptions and a reshuffling of global coal trade routes. Prices spiked again, reaching around $300 to $350 per ton, as Europe sought alternative suppliers and logistics became more expensive. Additionally, China's

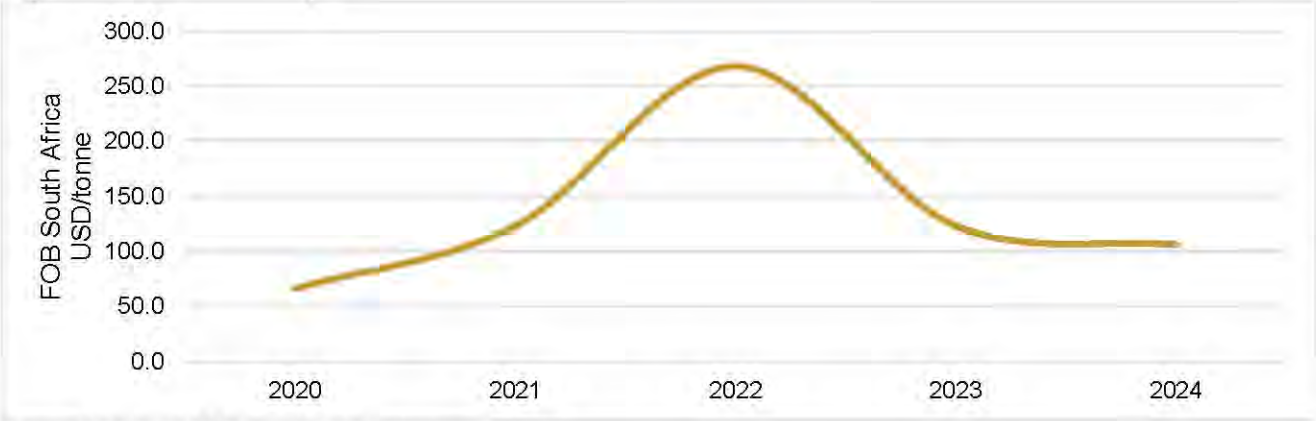
lockdowns and a slowdown in steel demand in the second half of the year brought some relief to prices, but overall, they remained high due to tight supply.

2023: Coking coal prices in 2023 began to normalize, falling to an average of $200 to $250 per ton as supply chains gradually stabilized, and global economic growth slowed. China's reopening post-COVID lockdowns bolstered demand initially, but weakening global steel production and high inflationary pressures dampened price increases. Australia, a major exporter of coking coal, saw an increase in output as it recovered from previous weather-related disruptions, further helping to stabilize prices.

2024: In 2024, coking coal prices are expected to face downward pressure, staying within a range of $180 to $220 per ton. Global steel demand is forecasted to slow, especially with the ongoing shift towards decarbonization and greener production methods. Efforts by Europe and China to reduce reliance on traditional coking coal in favor of scrap steel and hydrogen-based steelmaking technologies are expected to reduce demand for coking coal. Additionally, improved supply from major producers like Australia and Russia (depending on geopolitical developments) could further contribute to price stability.

## 8.3 Thermal coal prices

**Figure 38: Thermal coal price trends**




*Source: CRSISL MI&A Research, 2024 prices are estimates*

2019: In 2019, seaborne and South African thermal coal prices were relatively stable but faced downward pressure due to oversupply. Prices started the year at around $85 per ton for seaborne coal but declined to around $65 per ton by year-end, with South African thermal coal following a similar trajectory, dropping from around $90 to $60 per ton. The decline was driven by lower demand from Europe as the region continued its transition to renewable energy, and supply growth from major producers like Indonesia and Australia. However, demand from India and Southeast Asia helped support prices. South African coal exports remained steady, with India being a key buyer, but competition from cheaper Indonesian coal limited price increases.

2020: Thermal coal prices, including South African coal, dropped significantly in 2020 due to the global impact of the COVID-19 pandemic. Prices for seaborne coal fell as low as $50 per ton in mid-2020, while South African coal saw similar declines, with Richards Bay prices averaging around $45 to $55 per ton. This was primarily driven by a collapse in electricity demand in Europe and other industrialized regions during lockdowns. However, India and China continued to import South African coal, which helped prices recover slightly by the end of the year, reaching around $60 per ton for both seaborne and South African grades.

2021: In 2021, thermal coal prices surged due to a combination of strong demand recovery and supply disruptions. Seaborne prices soared to over $180 per ton by October, driven by increased demand from China and India. South African coal followed this trend, with prices for Richards Bay coal jumping to around $200 per ton. Supply disruptions in key regions like Indonesia and Australia, coupled with China's informal ban on Australian coal, forced China to turn to South African and Indonesian coal, pushing prices higher. Additionally, a global energy crisis, spurred by natural gas shortages, led to greater reliance on coal for power generation, further driving up prices.

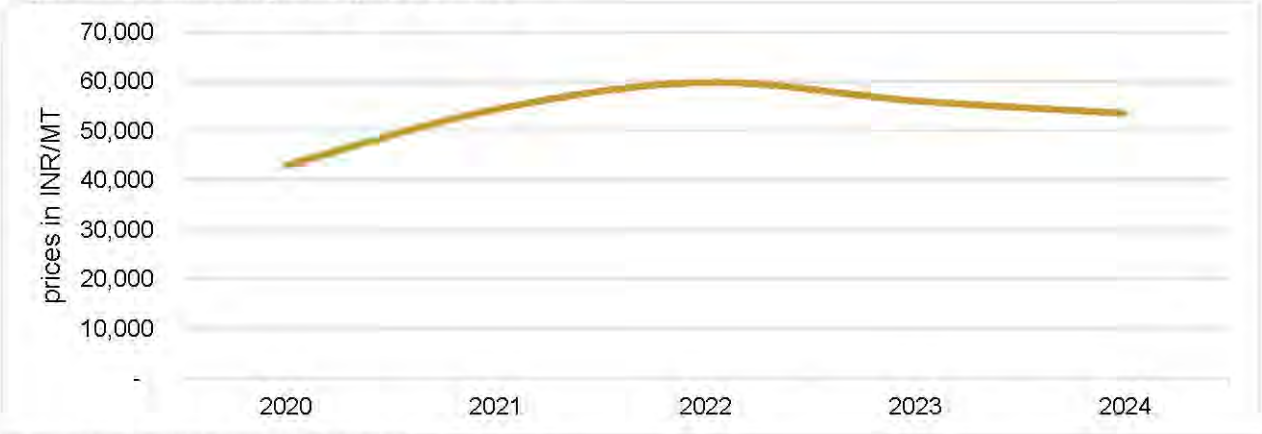
2022: Thermal coal prices remained elevated in 2022 due to the Russia-Ukraine conflict, which disrupted global energy markets. Europe, facing an energy crisis due to reduced access to Russian natural gas, increased its coal imports, driving up seaborne coal prices to over $300 per ton in the first half of the year. South African coal, which became an attractive alternative for European buyers, saw prices rise significantly, with Richards Bay coal hitting record highs of over $320 per ton. In the second half of the year, prices moderated slightly as Europe diversified its energy sources, but strong demand from Asian markets kept both seaborne and South African coal prices elevated, ending the year around $200 per ton.

2023: Thermal coal prices, including South African grades, began to stabilize in 2023 but remained volatile. Seaborne coal traded between $150 and $180 per ton, while South African thermal coal (Richards Bay) ranged from $140 to $180 per ton. The easing of Europe's energy crisis, combined with increased renewable energy generation, led to lower coal demand from Europe. However, strong demand from China, India, and Southeast Asia sustained the market. South African coal remained in high demand from India, and Europe continued to import South African coal, albeit at reduced levels compared to 2022. Supply constraints in Indonesia and Australia, due to weather disruptions and regulatory changes, also contributed to price volatility.

2024: In 2024, seaborne and South African thermal coal prices are expected to face downward pressure but remain relatively high, with seaborne prices projected to range between $120 and $160 per ton, and South African coal (Richards Bay) around $130 to $160 per ton. Europe's reliance on coal is expected to decrease further as renewable energy capacity grows, reducing demand for both seaborne and South African coal. However, robust demand from Asian markets, particularly India and China, is expected to support prices. South Africa will likely continue to play a key role in supplying both Asian and European markets, though the global push for decarbonization and cleaner energy sources could gradually reduce demand over the longer term.

## 8.4 Indian long steel prices

**Figure 39: Indian long steel price trends**




*Source: CRISIL MI&A Research, 2024 prices are estimates*

2019: In 2019, India's long steel prices were relatively stable, though they experienced some fluctuations due to domestic demand and global economic factors. Long steel products such as rebar and wire rods saw prices ranging between ₹37,000 and ₹41,000 per ton throughout the year. Demand was driven largely by the construction and infrastructure sectors, supported by government initiatives like affordable housing projects and road development. However, the global economic slowdown and uncertainty, especially in the automobile and manufacturing sectors, led to softer demand in the second half of the year, slightly pulling prices down.

2020: India's long steel prices faced significant pressure in 2020 due to the COVID-19 pandemic. Lockdowns and disruptions in construction and industrial activity caused a sharp drop in demand during the first half of the year. Prices fell to around ₹32,000 to ₹35,000 per ton by mid-2020. However, as the government lifted lockdowns and implemented stimulus measures focused on infrastructure development, demand began to recover. By the end of the year, prices rebounded to around ₹40,000 per ton, supported by a surge in infrastructure projects and a pick-up in residential construction activity.

2021: In 2021, long steel prices in India surged due to strong demand recovery and rising raw material costs. Prices reached as high as ₹60,000 to ₹65,000 per ton in mid-2021, driven by a post-pandemic infrastructure boom and the government's focus on large-scale construction projects. The sharp increase in prices was also influenced by global supply chain disruptions, including a rise in iron ore and coking coal prices, which increased production costs for steel manufacturers. In addition, export demand for Indian steel rose as global markets faced supply shortages. Prices moderated slightly by the end of the year but remained elevated at around ₹50,000 per ton.

2022: In 2022, India's long steel prices remained volatile but continued to trend higher for much of the year. Prices fluctuated between ₹50,000 and ₹58,000 per ton. This was driven by global factors such as the Russia-Ukraine conflict, which disrupted supply chains and led to higher raw material costs. The conflict also led to energy price inflation, further pushing up production costs for steel manufacturers. On the domestic front, strong government spending on infrastructure projects like highways, railways, and urban development, along with a recovery in real estate, supported demand for long steel products. However, the second half of the year saw some moderation in prices as global commodity markets stabilized and demand from the construction sector softened.

2023: In 2023, long steel prices in India experienced some moderation as global supply chains began to stabilize, and raw material prices, such as iron ore and coking coal, saw some corrections. Prices ranged between ₹45,000 and ₹52,000 per ton for much of the year. While domestic demand remained robust due to ongoing infrastructure projects and a steady recovery in real estate, high inflation and rising interest rates weighed on consumer demand for housing. The government's continued focus on infrastructure development helped sustain long steel demand, but a weaker global economic outlook limited export opportunities for Indian steel manufacturers.

2024: In 2024, India's long steel prices are expected to remain stable, ranging between ₹48,000 and ₹55,000 per ton, though there may be some pressure from slowing global demand. The Indian government's commitment to infrastructure development, as seen in the National Infrastructure Pipeline (NIP) and projects like the Smart Cities Mission, is expected to support domestic demand. However, rising environmental regulations and the global push toward decarbonization could increase production costs for steel manufacturers, potentially leading to modest price increases. Additionally, any volatility in global raw material prices could impact domestic steel pricing.

# 9. Domestic steel pipes and tubes market: brief overview

Demand for steel pipes and tubes is driven by multiple end-use sectors. Major categories include:

1. **Structurals**, which has an estimated 32-35% share of the total demand. The segment includes affordable housing, real estate, automobiles, transport infrastructure (metros, airports, etc.), warehousing, etc.

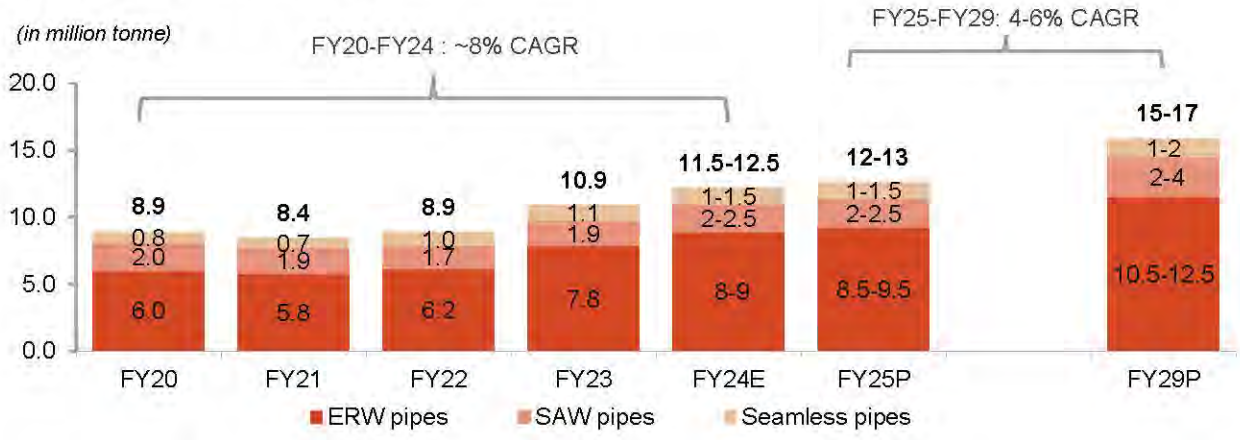
2. **Irrigation and Water Supply and Sanitation (WSS)**, with an estimated share of 25-27%. Swachh Bharat Mission, Jal Jeevan Mission, Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and other state level programs are the key drivers for this segment.

3. **Oil and Gas**, with an estimated share of 14-16%. As of April 2024, India's refining capacity stood at 256.8 million metric tons per annum (MMTPA) across 23 refineries, with the Indian Oil Corporation (IOC) leading as the largest domestic refiner with a capacity of 70.1 MMTPA. Pipelines are a safer, more feasible, economical, and environmentally sound alternative to transporting oil, gas, and petroleum products over long distances than most other modes. Improvement in supply infrastructure such as new LNG terminals, gas pipelines, crude oil infrastructure, expansion of City Gas Distribution (CGD) networks will continue to drive steel pipe demand from the segments.

4. **Others,** include demand from rest smaller segments, such as power, factories and industrial segments (excl. Oil and Gas), among others, and has an estimated share of 24-26%

In term of product category demand is bifurcated into Electric Resistance Welded (ERW)Steel pipes, Submerged Arc Welding (SAW) pipes and Seamless pipes.

**Figure 40: Steel Pipe demand**



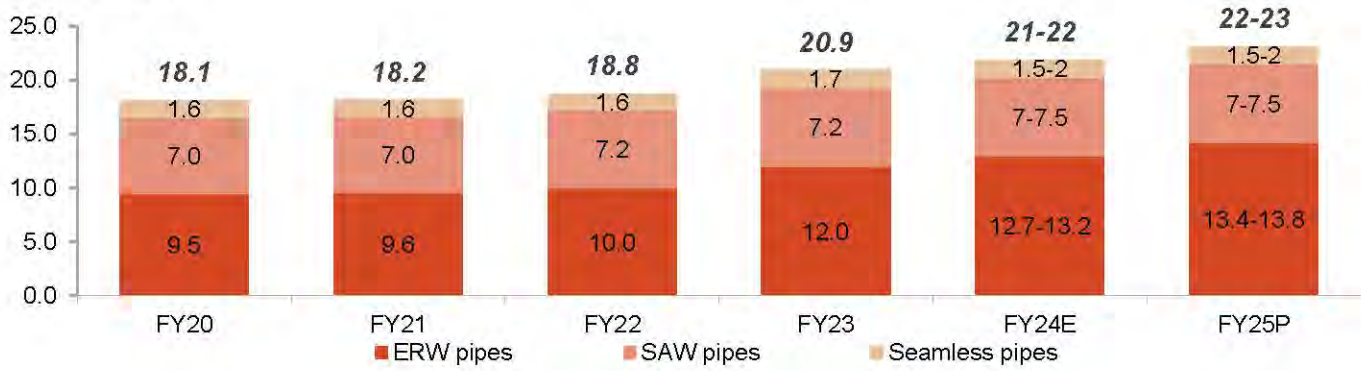

*Source: CRISIL MI&A Research*

Steel pipe demand is expected to grow by 5-6% in fiscal 2025 after an estimated growth rate of ~11-12% in fiscal year 2024. Over the fiscal years 2025-2029, steel pipe demand is likely to grow with a CAGR of 4-6%. Demand is likely to remain healthy across structural, oil and gas, irrigation, and water supply and sanitation (WSS) segments led by infrastructure and construction, water transport infrastructure, oil exploration and transportation, the creation of gas infrastructure, and increasing micro-irrigation investments. The major driver of steel pipe demand is the government's investments in bolstering oil, gas, and water transport infrastructure.

On the supply-side, as per CRISIL MI&A estimates, overall steel pipe domestic capacity is estimated at 21-22 million tonnes by the end of fiscal 24. APL Apollo group is the largest players with an overall installed capacity of 3.8 million tonnes. Some other key players in the segment include Man Industries, Surya Roshini, Tata Steel BSL, Maharashtra Seamless, AMNS, Jindal SAW Ltd., JSW BPSL, among others. The industry also has more the 100 small scale players with capacity below 100 kTPA, operating in the domestic space.

**Figure 41: Steel pipe production capacity**

*(in million tonne)*




*Source: CRISIL MI&A Research*

# 10. Low-carbon steel: Focus on RE usage in IF

Steel production is a significant contributor to greenhouse gas emissions, accounting for around 7-9% of global $CO_2$ emissions as the traditional steel production process involves the reduction of iron ore to iron, requiring large amounts of energy and subsequent release of $CO_2$. Additionally, the production process often involves the use of coal and other fossil fuels, further exacerbating the environmental impact.

India is currently the world's second-largest crude steel producer, with a capacity of 179.5 million tonnes of crude steel as of FY 2023-24. While steel is vital for the country's infrastructure development, its production is energy-intensive, relying heavily on coal, which results in significant carbon emissions. The steel sector accounts for 10-12% of India's total carbon emissions, and the emission intensity of Indian steel, at 2.54 tons of CO2 per ton of crude steel (tCO2/tcs), is higher than the global average of 1.91 tCO2/tcs. India's lower availability of high-grade iron ore, limited scrap for recycling, and reliance on captive coal-based power plants has kept emission from steel production higher than the global average.

With India's steel consumption expected to grow significantly, the challenge is to increase production while reducing emissions. The traditional steel production pathways are unsustainable in the long run, both from an environmental and economic perspective. There is a growing demand from global buyers, particularly in Europe and North America, for steel produced through low-carbon or green methods, a trend that is only expected to intensify. Thus, India must position itself at the forefront of green steel production to remain competitive in global markets.

In this regard, and as India aims to achieve net-zero carbon emissions by 2070, greening the steel sector has become an urgent priority. The government has set a target of increasing steel consumption, which is expected to grow beyond 2030, while also reducing carbon emissions from the sector.

The Ministry of Steel in India has outlined a roadmap to decarbonize the steel sector, with specific focus areas for the short, medium, and long terms.

**Short-term (FY 2030):**

- Energy efficiency measures
- Resource efficiency improvements
- Increased use of renewable energy sources

**Medium-term (2030-2047):**

- Green Hydrogen-based steel making
- Carbon Capture, Utilization and Storage (CCUS) technologies

**Long-term (Beyond-2047):**

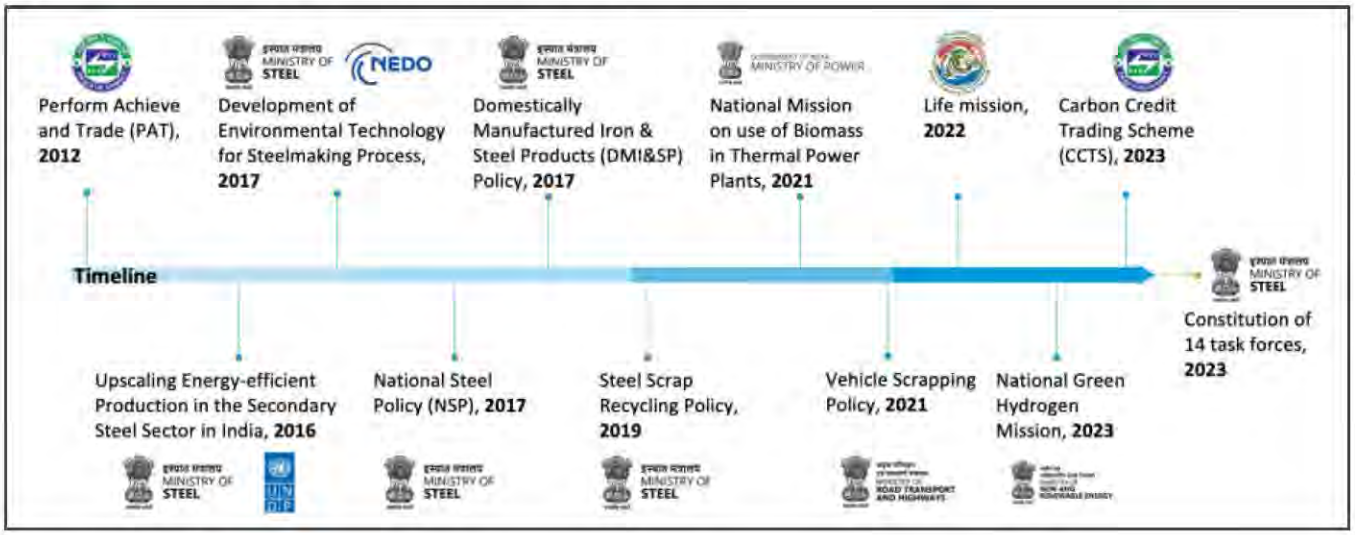
- Disruptive alternative technological innovations

This phased approach aims to gradually transition the domestic steel sector towards a low-carbon future, with increasingly ambitious targets and innovative solutions over time.

Steps taken by the government for promoting decarbonization in steel industry include: -

- 13 Task Forces had been constituted with the engagement of industry, academia, think tanks, S&T bodies, different Ministries and other stakeholders to discuss, deliberate and recommend upon different levers of decarbonization of steel sector.
- Steel Scrap Recycling Policy, 2019 to enhance the availability of domestically generated scrap to reduce the consumption of coal in steel making.
- The Ministry of New and Renewable Energy (MNRE) has announced the National Green Hydrogen Mission for green hydrogen production and usage. The steel sector has also been made a stakeholder in the Mission.
- Motor Vehicles (Registration and Functions of Vehicles Scrapping Facility) Rules September 2021 envisages to increase availability of scrap in the steel sector.
- The National Solar Mission launched by MNRE in January 2010 promotes the use of solar energy and also helps reduce the emission of steel industry.
- Perform, Achieve and Trade (PAT) scheme, under National Mission for Enhanced Energy Efficiency, incentivizes steel industry to reduce energy consumption.
- The steel sector has adopted the Best Available Technologies (BAT) available globally, in the modernization & expansions projects.
- Japan's New Energy and Industrial Technology Development Organization (NEDO) Model Projects for Energy Efficiency Improvement have been implemented in steel plants.
- The Ministry of Steel is also continuously engaging in discussions with various stakeholders towards decarbonization of the steel sector.

**Figure 42: Timeline of green initiatives for steel sector**




*Source: Ministry of Steel*

The Indian government released the Taxonomy of Green Steel in Dec '24, a significant milestone in transitioning towards a low-carbon economy. This taxonomy defines "green steel" as steel produced with a CO2 equivalent emission intensity less than 2.2 tonnes of $CO_2e$ per tonne of finished steel (tfs). The greenness of the steel will be expressed as a percentage based on how much the steel plant's emission intensity is lower compared to the 2.2 t-$CO_2e$/tfs threshold.

The taxonomy rates green steel into three categories:

- Five-star-green-rated steel: Emission intensity lower than 1.6 t-CO2e/tfs

- Four-star-green-rated steel: Emission intensity between 1.6 and 2.0 t-CO2e/tfs
- Three-star-green-rated steel: Emission intensity between 2.0 and 2.2 t-CO2e/tfs

Steel with emission intensity higher than 2.2 t-CO2e/tfs will not be eligible for a green rating. The adoption of this taxonomy is seen as a mandate to achieve environmental sustainability targets, with the goal of reducing emission intensity to 2.2 tCO2 per tonne by 2030. Achieving low carbon steel production in India requires an ecosystem that supports decarbonization across the steel value chain. A balance must be struck between incentivizing incremental decarbonization across various production methods and establishing strict standards for fossil-free or near-zero emission steel production. A robust certification and monitoring framework is necessary to track the emission intensity of steel and certify products as green. This framework would involve the establishment of an oversight body to monitor, report, and verify (MRV) emissions across steel plants, as well as a registry for green steel certification.

The DRI-IF based steel production is an emission heavy route. As per the 'Greening the Steel Sector in India: Roadmap and Action Plan (GSSI)', Ministry of Steel report, ~90% of the total output from the coal-based DRI plants is used by the IF based steel producers. Since coal based DRI has higher carbon emission as compared to the BF-BoF based route, total emission from mine to finished steel is higher for IF based producers.

Since electricity is a major part of energy and power cost for IF based producers, one of the immediate ways to reduce the carbon footprint of steel production without altering the manufacturing process is by increasing the use of renewable energy (RE). Electricity consumption in the steel sector is projected to nearly double from 94 TWh in FY 2021-22 to 184 TWh by 2030-31, as per the GSSI report. Currently, renewable energy accounts for only about 7.2% of the electricity used in India's steel sector, but this share is expected to rise significantly with the implementation of Renewable Purchase Obligations (RPOs) and other policies. The government has set ambitious Renewable Purchase Obligations (RPOs) of 43.33% by 2030, which would significantly increase the share of renewable energy in steel production and lower the sector's carbon intensity.

Currently, IF based producers consume 0.7-0.9 MWh electricity to produce one tonne of product. This translates into 0.5-0.7 t $CO_2$ emission per tonne of output, considering 0.716 t $CO_2$ per MWh as average emission factor of grid electricity inclusive of adjustment for RE transaction through open access and captive power injection into the grid. As per CRISIL MI&A estimates for fiscal 2024, ~77% was from carbon emitting sources such as coal, natural gas, and diesel among others and ~23% was from renewable sources such as hydro, solar, wind, and nuclear, among others. A-One Steel India Pvt Ltd (ASIPL) uses a combination of solar, wind, hydro, waste heat recovery boilers and electricity from grid. Effective non-carbon electricity utilization, as per data shared by the company, is ~90%. Current emission from electricity consumption for a player sourcing 100% electricity from grid would be 0.65-0.70 $CO_2e$ per ton of crude steel, while emission from electricity consumption for ASIPL is estimated to be 0.05-0.09 $CO_2e$ per ton of crude steel, significantly lower than its peers.

**Figure 43: Emission from electricity consumption for IF based players:**

| Absolute embedded emission from electricity consumption ($CO_2$ emission) | | Consumption of RE=> | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 95% |
| Specific electricity consumption (MWh) | 0.700 | 0.58 | 0.52 | 0.46 | 0.40 | 0.35 | 0.29 | 0.23 | 0.17 | 0.12 | 0.06 | 0.03 |
| | 0.750 | 0.62 | 0.56 | 0.50 | 0.43 | 0.37 | 0.31 | 0.25 | 0.19 | 0.12 | 0.06 | 0.03 |
| | 0.775 | 0.64 | 0.58 | 0.51 | 0.45 | 0.38 | 0.32 | 0.26 | 0.19 | 0.13 | 0.06 | 0.03 |
| | 0.825 | 0.68 | 0.61 | 0.54 | 0.48 | 0.41 | 0.34 | 0.27 | 0.20 | 0.14 | 0.07 | 0.03 |
| | 0.875 | 0.72 | 0.65 | 0.58 | 0.51 | 0.43 | 0.36 | 0.29 | 0.22 | 0.14 | 0.07 | 0.04 |
| | 0.925 | 0.76 | 0.69 | 0.61 | 0.53 | 0.46 | 0.38 | 0.31 | 0.23 | 0.15 | 0.08 | 0.04 |
| | 0.975 | 0.80 | 0.72 | 0.64 | 0.56 | 0.48 | 0.40 | 0.32 | 0.24 | 0.16 | 0.08 | 0.04 |

| Decline in electricity based emission ($CO_2$ emission) | | Consumption of RE=> | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 95% |
| Specific electricity consumption (MWh) | 0.700 | -2% | -12% | -22% | -32% | -41% | -51% | -61% | -71% | -80% | -90% | -95% |
| | 0.750 | 5% | -6% | -16% | -27% | -37% | -48% | -58% | -69% | -79% | -90% | -95% |
| | 0.775 | 8% | -3% | -13% | -24% | -35% | -46% | -57% | -68% | -78% | -89% | -95% |
| | 0.825 | 15% | 4% | -8% | -19% | -31% | -42% | -54% | -65% | -77% | -88% | -94% |
| | 0.875 | 22% | 10% | -2% | -14% | -27% | -39% | -51% | -63% | -76% | -88% | -94% |
| | 0.925 | 29% | 16% | 3% | -10% | -22% | -35% | -48% | -61% | -74% | -87% | -94% |
| | 0.975 | 36% | 23% | 9% | -5% | -18% | -32% | -46% | -59% | -73% | -86% | -93% |

*Source: CRISIL MI&A Research estimates*

ASIPL has also been awarded certification by GreenPro for plant at Gowribidanur Taluk, Karnataka and Hindupur (M), Andhra Pradesh, for Fe 500D CRS – 8mm to 32mm, Fe 550 CRS – 8mm to 32mm and Fe 550D CRS – 8mm to 32mm, as it meets the requirement set for GreenPro Ecolabel and qualifies as green product.

GreenPro Ecolabel is accredited by Global Ecolabelling Network (GEN) through GENICES – GEN's Internationally Coordinated Ecolabelling System.

# 11. Government regulations and policies in the Indian steel sector

**NSP 2017:** The policy is an effort to steer the industry towards achieving its full potential and enhance steel production with a focus on high-end value-added steel while being globally competitive.

**Vision:** To develop a technologically advanced and globally competitive steel industry that promotes economic growth.

**Key targets:**

- Self-sufficiency in steel production by providing policy support and guidance to private manufacturers, MSME steel producers, central public sector enterprises and encourage adequate capacity additions
- Cost-efficient production and domestic availability of iron ore, coking coal and natural gas
- Increase per capita steel consumption to 160 kg by fiscal 2031
- Meet the domestic demand for high-grade automotive, electrical and special steel and alloys for strategic applications by fiscal 2031
- Increase domestic availability of washed coking coal to reduce the reliance of import on coking coal from ~85% to ~65% by fiscal 2031

**PLI scheme:**

The Production Linked Incentive (PLI) Scheme for Specialty Steel was launched by the Indian government on July 22, 2021, with a financial outlay of ₹6,322 crores. The scheme's primary objective is to boost the domestic production of high-quality, value-added steel, reduce dependency on imports, and enhance India's standing in the global steel market. By focusing on the specialty steel segment, the scheme encourages the production of steel with advanced properties, such as corrosion resistance and high strength, which are vital for industries like defense, aerospace, and power generation.

To benefit from the PLI scheme, companies must meet specific investment and production thresholds. The scheme incentivizes domestic manufacturers through three slabs of incentives, which are tied to incremental production and capital investment. As of 2022, the government had received applications from 35 companies, and 67 projects were selected for participation, attracting over ₹42,500 crores in investments. This initiative is expected to add 26 million tonnes of specialty steel capacity and create 70,000 jobs by 2030.

The scheme is part of the broader strategy to elevate India's steel sector, which has been growing rapidly. India has been the second-largest crude steel producer globally since 2018. However, there has been a notable gap in the production of specialty steel, which is critical for high-end applications. By promoting the domestic production of these advanced materials, the PLI scheme aims to position India as a global hub for specialty steel manufacturing.

Through this initiative, the government not only seeks to enhance the technological capabilities of the domestic steel sector but also to make it globally competitive. This focus on high-value steel products will help the country move up the value chain, ensuring that Indian manufacturers meet both domestic demand and increase exports to international markets.

In 2021, the PLI scheme for specialty steel was approved by the union cabinet with a five-year financial outlay of Rs 6,322 crore to promote the manufacturing of specialty steel. In 2022, 67 applications from 30 companies were selected with a committed investment of Rs 42,500 crore.

**Steel import monitoring system:**

The Steel Import Monitoring System (SIMS) in India was launched by the Ministry of Commerce and Industry to track and regulate the import of steel products. This system, which became operational in 2019, requires importers to register their steel imports in advance and obtain a license before bringing steel products into the country. The purpose of SIMS is to monitor the quantity and quality of steel imports, ensuring transparency and providing crucial data for policy-making.

Importers must submit information regarding the steel products they intend to import, such as product description, country of origin, and quantity, through the SIMS online portal. This system helps the government keep track of imported steel, prevent any surge in low-quality or underpriced imports, and ensure that the domestic steel industry is not adversely affected by unfair trade practices. Additionally, SIMS assists in monitoring import trends, supporting India's broader aim of achieving self-sufficiency in steel production.

**Steel and steel products (quality control) orders:**

The Quality Control Orders (QCOs) for the steel industry in India are part of the government's broader initiative to ensure the production and importation of steel products that meet stringent quality standards. These orders are issued by the Ministry of Steel in accordance with the Bureau of Indian Standards (BIS) Act, 2016, and they require both domestic manufacturers and importers to adhere to the relevant BIS specifications for a variety of steel products.

The first significant notification for steel QCOs was issued in 2017, covering several essential steel products like billets, bars, rods, plates, and flat products. Over the years, additional QCOs have been notified, expanding the range of covered products. As of 2023, the QCOs cover more than 145 steel products, including alloy and non-alloy steels, galvanized products, and special steels used in critical industries such as construction, automotive, and infrastructure. The BIS marks are mandatory for all covered products, ensuring that only certified, high-quality steel can be manufactured, imported, or sold in the Indian market.

The implementation of QCOs follows a phased timeline. Typically, once a QCO is notified, the industry is given a transition period—usually six months—to comply with the BIS certification requirements. This allows manufacturers and importers to adjust their production or supply chains to meet the required standards. Any steel products that do not meet the certification requirements after the given timeline are not allowed to be sold, used, or imported in India. Non-compliance may result in penalties, product recalls, or import restrictions.

In terms of scope, the QCOs apply to all producers, whether foreign or domestic, which helps ensure that substandard or low-cost steel does not undermine the quality and safety of infrastructure projects in India. These orders are regularly updated to include new categories of steel products, reflecting the evolving needs of the industry and government objectives related to the "Atmanirbhar Bharat" initiative, aiming for self-reliance in steel production.

**Steel scrap recycling policy (2019):** The policy was introduced to facilitate and promote the establishment of metal scrapping centres and ensures that quality scrap is available for the steel industry.

The objective of the policy is to promote a formal and scientific collection, dismantling and processing activities for end-of-life products that are sources of recyclable (ferrous, non-ferrous and other non-metallic) scraps, which will

lead to resource conservation and energy savings and setting up of an environmentally sound management system for handling ferrous scrap.

**DMI&SP policy:** The policy mandates preference to locally manufactured iron and steel products with a minimum of 15–50% value addition in government procurement. This also supports value-added steel production.

The policy is envisaged to promote growth and development of the domestic steel industry and reduce the inclination to use low-quality and low-cost imported steel in government-funded projects.

**Pilot projects for use of green hydrogen in steel sector:** Under the National Green Hydrogen Mission, the Ministry of New and Renewable Energy will implement pilot projects in the steel sector, for replacing fossil fuels and fossil fuel-based feedstock with green hydrogen and its derivatives.

The scheme envisages steel plants to blend a small percentage of green hydrogen in their processes and increase the proportion progressively considering the higher cost of green hydrogen at present, with improvement in cost-economics and advancement of technology. The scheme will be implemented with a total budgetary outlay of Rs 455 crore until fiscal 2030.

**Figure 44: Major policy timeline for steel manufacturing sector**


*Source: CRISIL MI&A Research*

# 12. Comparison of parameters: financial ratios and facilities

## 12.1 Comparison of financial parameters

To compare the financial performance of A-One Steel India Pvt Ltd (ASIPL – consolidated financials), an industry set consisting of peers manufacturing long steel have been considered. A total of 4 players have been included in the industry set, producing finished steel.

**Industry set 1:** Standalone financials of the following players has been used for the industry set: Jai Balaji Industries Ltd., MSP Steel and Power Ltd., Shyam Metallics and Energy Ltd., and Steel Exchange India Ltd.

**Industry set 2:** Large integrated steel players with presence across the value chain includes JSW Steel Ltd, Tata Steel Ltd (TSL), Jindal Steel and Power Ltd (JSPL) and SAIL.

Please note that for revenue and margin growth, share of revenue in total set is used as weights. For other ratios and multiples, summation of line item of each company (wherever data is available) is used to arrive at ratios for the industry set. Adjustments to the line items are made to ensure ratio comparison at similar levels between ASIPL and its peers.

For further details, please refer to the key financials provided for each player in the next section.

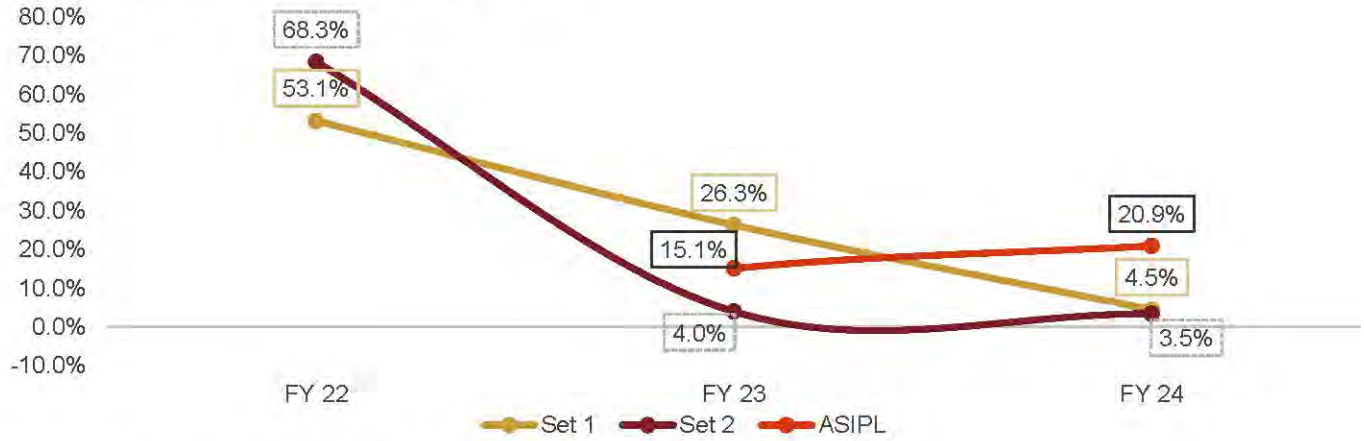
**ASIPL's revenue growth vs. industry peers'**

While fiscal 2022 was a volatile year for commodity prices, revenue realisation improved across the steel industry. Revenue for the medium and small players (Industry set 1) increased by 53.1%, while for large players revenue increased by 68% (Industry set 2). Due to better export realization opportunity for set 2 players, revenue growth was higher in fiscal 2022.

In fiscal 2023, with the imposition of export duty by government of India between May 22 to Nov 22 to control price volatility, prices for steel and its raw material declined. However, domestic steel demand and volume, driven by increase in government spending, remained healthy, growing at 13.4% on annual basis. At cumulative levels, revenue for Industry set 2 increased by 4% and industry set 1 increased by 28%. Decline in finished steel export by 50% in fiscal 2023 and decline in steel prices led to limited revenue growth. Better long steel demand from building, construction, and infrastructure sectors kept set 1 growth higher. For ASIPL, double digit decline in sales volume of HR, billets and sponge iron, with softer sales volume for tubes and pipes were observed. However, better volumes in scrap, coal and iron ore sales helped achieve operating income growth of 15.1%

In fiscal 2024, while revenue growth for both, set 1 and set 2 companies, were moderate, ASIPL's sales volume growth has been in double digit for all the segments, except for scrap sales.

**Figure 45: Weighted average revenue growth**




*Source: A-One Steel India Pvt Ltd, Company annual reports and publications for Set 1 and 2*

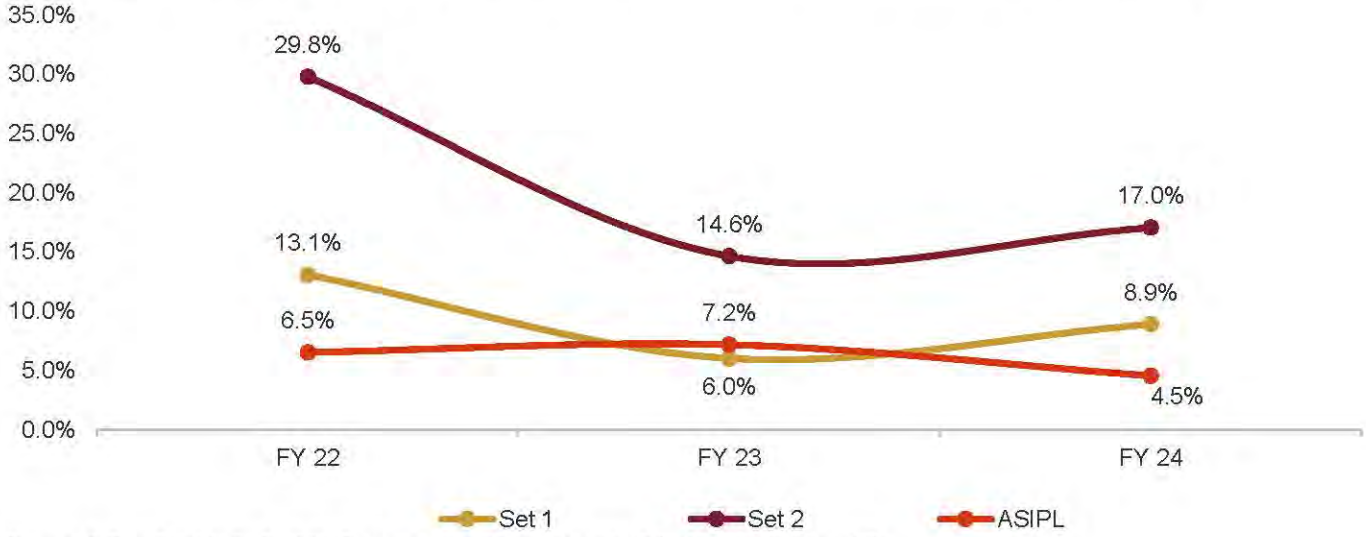
**ASIPL's profit margins vs. industry peers'**

In fiscal 2022, increase in realization was closely followed by increase in raw material cost, due to which margins for players were modest. Large players, however, were able to mitigate the impact of rising raw material cost with the support of long-term supply agreements and foreign assets. Simultaneously, steel exports from India, with better realisation prospects, increased significantly. This resulted in an improvement of margin for industry set 2 peers, with a healthy share of exports in the total steel sales.

In fiscal 2023, imposition of duty by the government of India reduced Indian prices of steel and raw material, led to a steep decline in prices. However, industry set 2 peers continued to face elevated cost pressure from volatile coking coal prices, leading to a significant drop in margins. Lower per tonne realization for long steel led to decline in margin for set 1 industry peers.

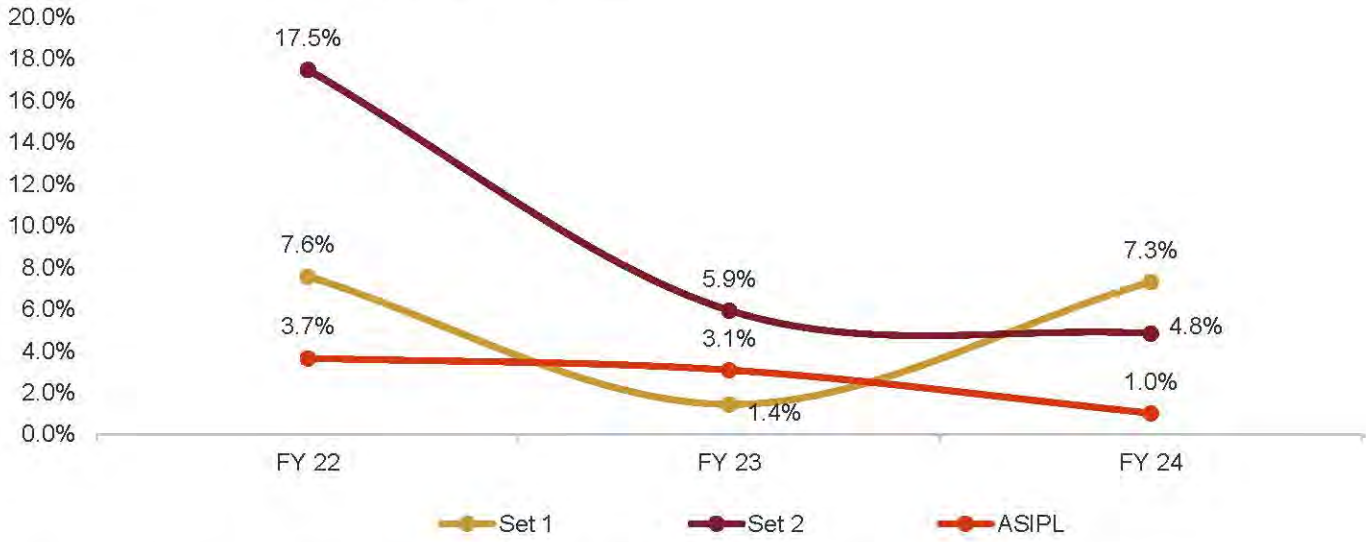
Between fiscal 2022 to fiscal 2023, margin of ASIPL improved by ~70 bps. Increase in operating expenses such as power and fuel cost, labour charges, freight and handling charges, repair and maintenance, among others, led to margins declining to 4.5% in fiscal 2024. Additionally, increase in interest expense on borrowing has led to decline in net margins. However, between fiscal 2022 to fiscal 2024, while margin for both set of steel companies, large (set 2) and small (set 1), were volatile, ASIPL's margin remained rangebound due to better focus on products sales portfolio and response to changing market scenario.

**Figure 46: Weighted avg. Operating Profit before Depreciation, Interest and Tax (OPBDIT) margin**




*Source: A-One Steel India Pvt Ltd, Company annual reports and publications* for Set 1 and 2

**Figure 47: Weighted avg. Net Profit Margin (PAT)**

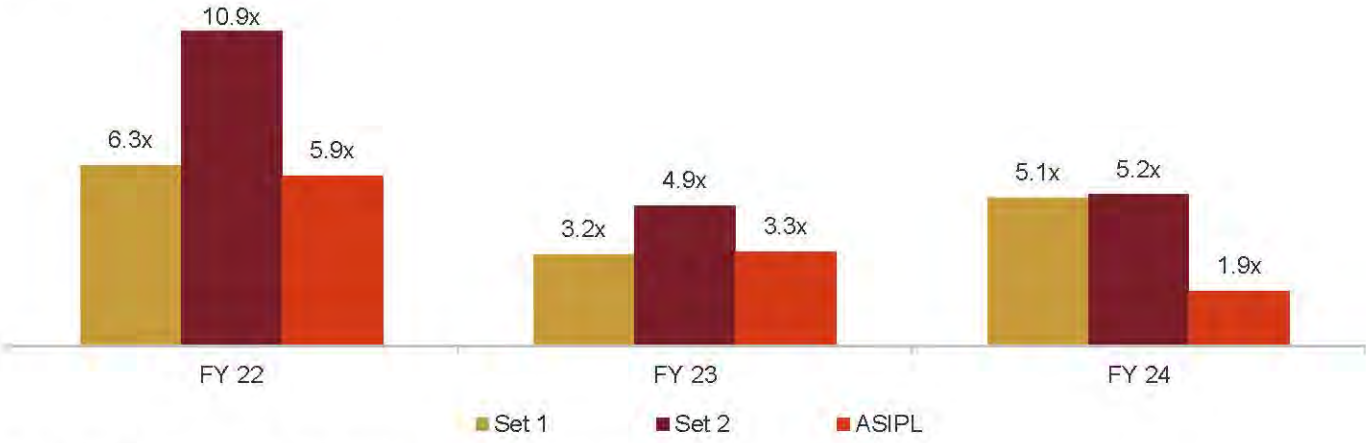



*Source: A-One Steel India Pvt Ltd, Company annual reports and publications for Set 1 and 2*

**ASIPL's interest service coverage ratio vs. industry peers':**

Industry set 1 has a lower interest service coverage ratio (ISCR), compared with industry set 2 due to lower margin in the segment. Volatility in fiscal 2022 supported better realisation for majority of players in the industry, especially large players with export opportunities. For fiscal 2023, companies raised debt to fuel their capacity expansion aspirations. With falling prices amid volatile raw material cost and lower margin led to lower ISCR for all players. This was more visible for set 1 players', due to non-integrated production structure. While the ratio declined for both the sets in fiscal 2023 and fiscal 2024, ASIPL's coverage ratio was lower due to higher interest expense and lower margin.

**Figure 48: Weighted average ISCR**



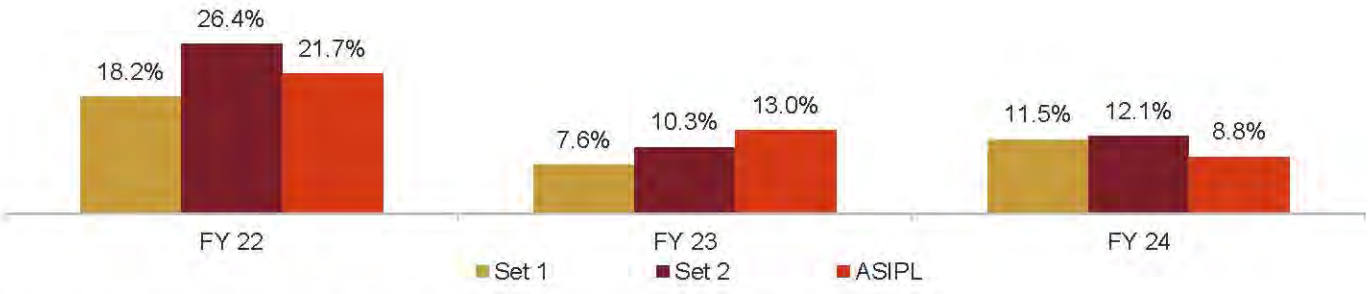

*Source: A-One Steel India Pvt Ltd, Company annual reports and publications for Set 1 and 2*

**ASIPL's return on capital employed vs. industry peers'**

Most of the large integrated steel mills in India have their own captive mines. Steel producers manufacturing sponge iron are largely dependent on merchant miners in India. As India has more than 300 working sponge iron units and over 900 induction furnace-based small players dependent on merchant miners, the cost of acquiring iron ore is at a premium for such steel manufacturers with respect to captive consumption. Therefore, players with a larger share of captive usage have higher return than players without iron ore mining lease. Similar trend is visible between industry set 1 (largely procure from merchant mines) and industry set 2 (mostly dependent on captive mines)

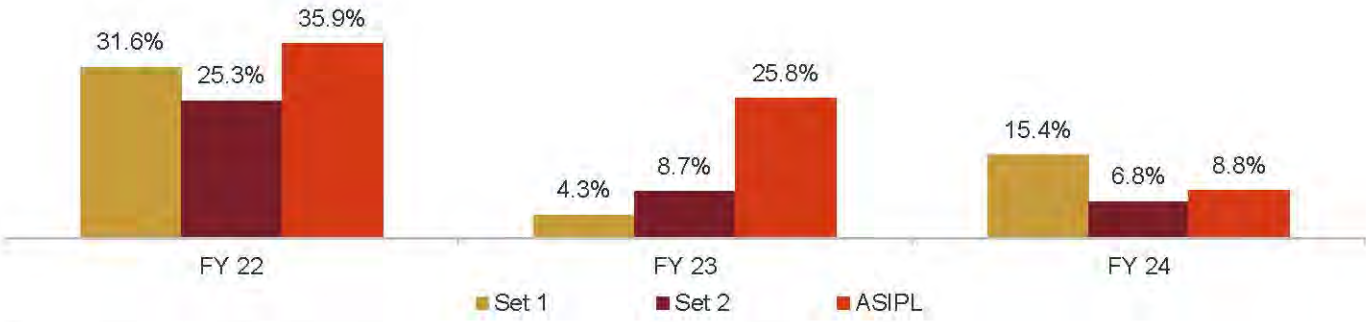
ASIPL has been able to perform at par with its peers when ROCE is compared with set 1 and set 2 peers. Even with lower margins, lower tangible net worth has helped kept ROE higher than set 2 peers.

**Figure 49: Weighted average ROCE**




*Source: A-One Steel India Pvt Ltd, Company annual reports and publications for Set 1 and 2*

**Figure 50: Weighted average ROE**

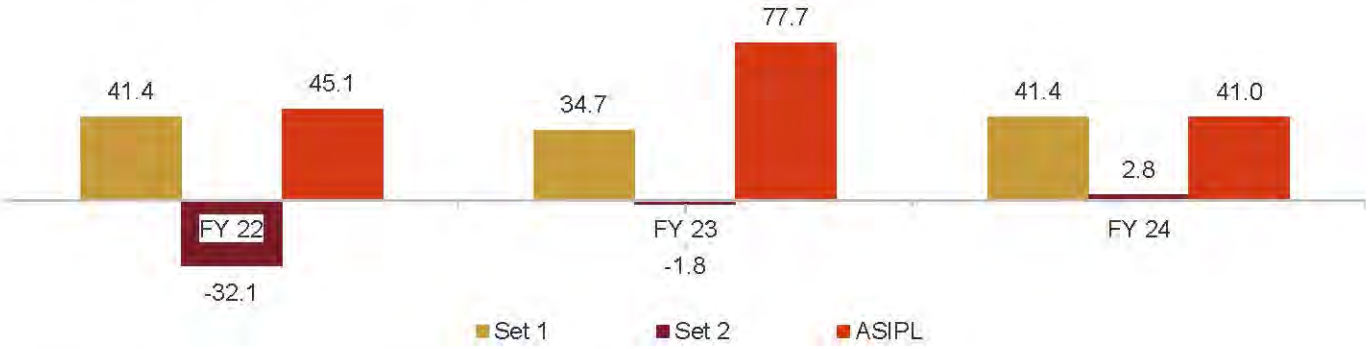



*Source: A-One Steel India Pvt Ltd, Company annual reports and publications for Set 1 and 2*

**ASIPL's working capital days vs. industry peers'**

ASIPL has improved its working capital performance w.r.t fiscal 2022 and fiscal 2023 and is not operating at levels similar to peer set 1, which is a closer representative peer set. Large players, with long term procurement and contract agreements are able to reduce conversion cycles, except for Steel Authority of India Limited, rest all players in set 2 usually have negative working capital days.

**Figure 51: Average working capital days**



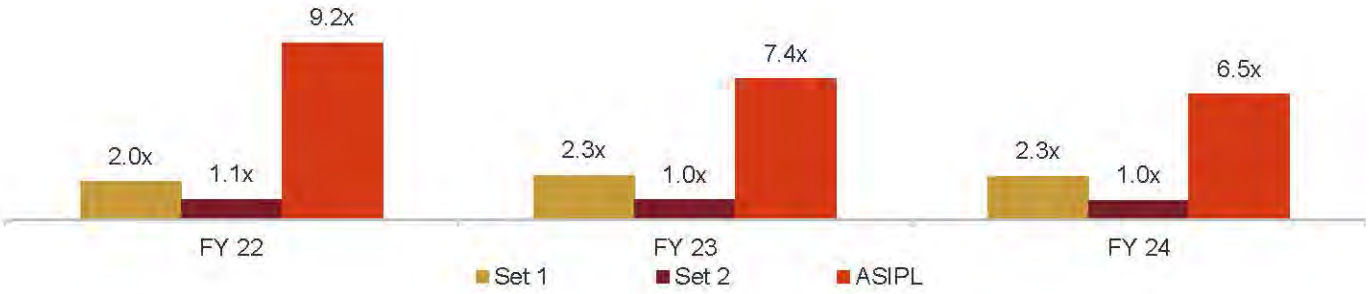

*Source: A-One Steel India Pvt Ltd, Company annual reports and publications for Set 1 and 2*

**ASIPL's fixed asset turnover ratio vs. industry peers'**

Large players in India produce steel through the BF route, which is more capital intensive than IF or EAF route. Hence, assets turnover ratio for large players (set 2) is lower than medium and small players (set 1). The capital expenditure required to set up hot rolled coil manufacturing facility via the DRI-IF route is substantially lower, at around Rs 2,000–2,500 crore per million tonne of production capacity, compared to the Rs 5,000–6,000 crore needed per million tonne of production capacity for the blast furnace-basic oxygen furnace route.

Over the years, ASIPL has been able to acquire and add key assets to its portfolio at a cost lower than brownfield or greenfield expansion. This has kept cumulative capital expenditure lower with respect to its industry peers and churn better operating income per unit capital expenditure. Asset turnover, by the end of fiscal 2024, were ~3 times better than set 1 peers and more than 6 times better than set 1 peers.

**Figure 52: Weighted average fixed asset turnover ratio**




*Source: A-One Steel India Pvt Ltd, Company annual reports and publications for Set 1 and 2*

**ASIPL's CFO / OPBDIT vs. industry peers'**

In fiscal 2022 and fiscal 2023, ASIPL's CFO were negative. However, in fiscal 2024, with better positive cash flow supported by better control of inventory and increase in outstanding due of creditors (other than micro and small enterprises), has helped ASIPL to convert its profit on books into cash.

**Figure 53: Weighted average CFO / OPBDIT**

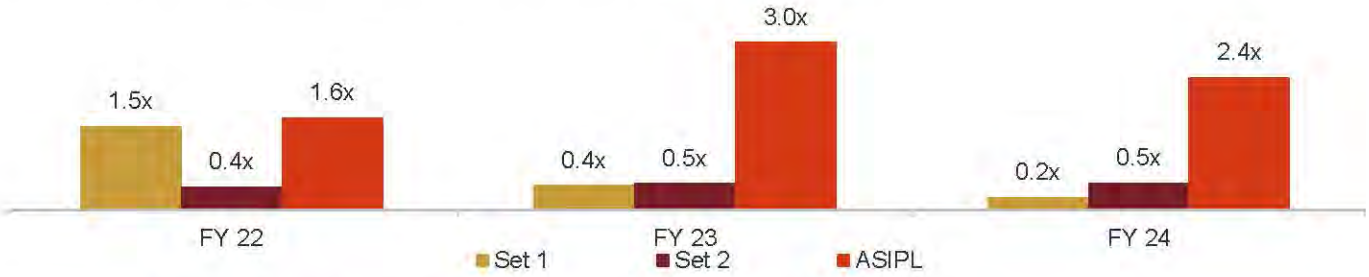

*Source: A-One Steel India Pvt Ltd, Company annual reports and publications for Set 1 and 2*

**ASIPL's debt-to-equity ratio vs. industry peers'**

Since the capital expenditure needed for an integrated steel plant is higher than that required to establish a new mining operation, steel mills use both debt and equity as sources of funds. In fiscal 2022, by leveraging the optimal market scenario, mills both primary and secondary, paid back their debt, thereby reducing the debt-to-equity ratio.

ASIPL is on its expansion journey, with significant addition to TMT capacity, addition of billet, GP and met coke capacities. Additions of these facilities and ramp-up of new capacity is funded largely through external borrowing, leading to a higher total debt / tangible net worth ratio.

**Figure 54: Weighted average leverage ratio (total debt / tangible net worth)**




*Source: A-One Steel India Pvt Ltd, Company annual reports and publications for Set 1 and 2*

## 12.2 Comparison of operational parameters

The steel production in India via. the DRI-IF route is distributed amongst more than 1000 crude steel producers. Due to concentration of players in each part of the value chain, both upstream and downstream expansion has scope for margin expansion and margin protection.

Among the crude steel manufacturing facilities, ASIPL's consolidated capacity is among the top 5 crude steel manufacturers in Southern part of India (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and Telangana). Please note the working capacity considered for ASIPL is as per Chartered Engineer Certificate, whereas working capacity of other players is as reported by Joint Plant Committee.

As of fiscal 2024, the total crude steel manufacturing capacity for the above considered Southern states, as per JPC, is ~32 million tonnes, of which ~19.7 million tonnes is with 6 large and medium steel producers.

**Table 10: Product portfolio mapping for ASIPL and peer companies**

| Company | Manufacturing capability | | | Product Offering | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | DRI facility | Crude steel | Cold rolling | HR Coils | Pipes/Tubes | GI Pipes | TMT/rebar | Ferro Alloys | Coke |
| APL Apollo Tubes | | | ● | | ● | ● | | | |
| Hariom Pipe Industries | ● | ● | ● | ● | ● | ● | | | |
| Hi tech Pipes | | | ● | | ● | ● | | | |
| Rama Steel Tubes | | | | | ● | ● | | | |
| JTL Industries | | | ● | ● | ● | ● | | | |
| Surya Roshni | | | ● | | ● | ● | | | |
| Sambhav Steel | ● | ● | ● | ● | ● | ● | | | |
| Vibhor Steel Tubes | | | | | ● | ● | | | |
| **A-one Steel India Pvt. Ltd.** | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| MSP Steel & Power Ltd | ● | ● | | | ● | | ● | | |
| Jal Balaji Industries | ● | ● | | | ● | | ● | ● | |
| Shyam Metalics and Energy Limited | ● | ● | ● | | ● | | ● | ● | ● |
| Steel Exchange India Limited | ● | ● | | | | | ● | | |

*Source: Company website, annual reports, investor presentations*
*Please note, cells with green markers indicate presence of the facility/product offering*

Above is a list mixed list of manufacturers in the pipes/tubes space and in the TMT/rebar industry producing via DRI-IF route. Majority of these players have focused on the long steel building and construction space. However, ASIPL in addition to having long steel production capabilities, also caters to the Steel pipe manufacturing space. ASIPL, in the above set of players, has the widest product offering for the domestic steel and its raw material consumers, spreading from coke to GI pipes which gives them access to multiple end-use industries such as construction & infrastructure industry, power plants construction, dams, airports, bridges, flyovers, stadiums, highways, underground structures, industrial structures, high rise residential buildings construction, and other industries.

**Table 11: Major production facilities available with ASIPL**

| Stage | Description of process | Facilities available with ASIPL |
|---|---|---|
| Mines/ extraction | • Iron Ore: Mining and beneficiation/ pelletisation<br>• Coal: Coking coal mining<br>• Limestone: Mining, crushing and preparation | No |
| Raw material preparation | • Scrap metal: Collection and sorting<br>• Fluxes and ferroalloys: Captive production (Facilities available for ferro silicon), *Procurement from market for other fluxes and ferro alloys | Yes |
| Iron Making | • Sponge iron: Captive production | Yes |
| Steel making | • Charging: Loading scrap metal, sponge iron, fluxes, and ferroalloys into the induction furnace<br>• Melting: Using electrical energy to melt the charged materials<br>• Refining: Adjusting the chemical composition by adding or removing elements<br>• De-slagging: Removing impurities from the molten metal<br>• Alloying: Adding specific elements to achieve desired steel properties<br>• Temperature Adjustment: Ensuring the molten steel is at the correct temperature for casting | Yes |
| Continuous casting | • Tundish: Pouring molten steel into a tundish to distribute it evenly<br>• Mold: Solidifying the steel into billets to a specific temperature under a hot charge technique as it passes through a water-cooled mold | Yes |
| Rolling Operation | • Reheating: Keeping hot-charged heating to a workable Temperature<br>• Rolling: Shaping the steel into desired forms such as sheets, bars, or rods | Yes |
| Finishing | • Cutting: Cutting the rolled steel to specified lengths<br>• Inspection: Checking for quality and defects<br>• Packaging: Preparing the final product for shipment | Yes |

*Source: Chartered Engineer Certificate shared by ASIPL*

ASIPL is also among few players in India producing pipes from flat steel using DRI process. Majority of the pipe manufacturers in India procure coils from either traders or large steel mills for producing wide variety of pipes, tubes and other structural products. Volatility in steel prices over the past few years has highlighted the need of integrated manufacturing, thereby shielding the margin pressure by securing raw material cost volatility for value-added products. Among the set of key pipe manufacturers, ASIPL is the only player with both backward integrated production facilities and TMT manufacturing capabilities.

### Barriers to entry for steel production industry

The steel industry is beset by several formidable challenges that create significant barriers to entry, including:

- High capital expenditures, which necessitate substantial upfront investments
- Protracted regulatory approval processes, which can be time-consuming and bureaucratic
- The requirement for multiple certifications prior to commencing manufacturing, adding to the complexity and cost of entry
- A limited and concentrated customer base, making it difficult for new entrants to acquire customers without established relationships

- The need to implement and sustain rigorous quality systems, ensuring compliance with customer requirements and industry standards
- The challenges of managing customer relationships and logistics, which demands a high degree of operational efficiency and supply chain expertise

**Brief profile of ASIPL and the players considered in sets 1 and 2.**

Snapshot of company financials used to calculate ratios (All figures in INR millions).

Please note all financials mentioned below are CRISIL adjusted numbers for better comparison of ratio and may not be same as company reported financials.

Snapshot of company financials used to calculate ratios (All figures in INR millions):

**A-One Steel India Pvt. Ltd. (ASIPL)**

A-One Steel India Pvt. Ltd. is part of A-One group and engages in the production of sponge iron, MS billets, TMT bars, HR Coils, and Pipes. The group also engages in the production of Met coke and ferro silicon. The company has multiple plants involved at various stages of steel manufacturing and material preparation plant at various locations in India, majorly concentrated in southern part of India. The company had a share of 0.27% in overall crude steel production in India and has ~1% share, as per fiscal 2024 sales figure of ASIPL, in domestic pipe market.

The group also has captive power plants along with some renewable power facilities, to meet its power needs.

**Table 12: List of installed capacity for ASIPL**

| Company Name | State | Location (PIN) | Product | End use | Capacity (tonnes) | Port distance (KM) |
|---|---|---|---|---|---|---|
| A-one Steel India Pvt. Ltd. | Karnataka | Ballari : 583123 | Ferro alloys | B2B Sales | 37,100 | < 450km from Goa-Mormugao Port |
| A-one Steel India Pvt. Ltd. | Karnataka | Ballari : 583123 | Met coke | B2B Sales | 72,000 | < 450km from Goa-Mormugao Port |
| Basai Steel and Power Pvt. Ltd. | Karnataka | Ballari : 583138 | HR Coil | Captive consumption-HR Pipes | 200,000 | < 450km from Goa-Mormugao Port |
| Basai Steel and Power Pvt. Ltd. | Karnataka | Ballari : 583138 | MS Billet | Captive consumption | 180,000 | < 450km from Goa-Mormugao Port |
| Basai Steel and Power Pvt. Ltd. | Karnataka | Ballari : 583138 | MS Pipes | Dealer network sales | 120,000 | < 450km from Goa-Mormugao Port |
| Basai Steel and Power Pvt. Ltd. | Karnataka | Ballari : 583138 | Sponge Iron | Captive consumption | 100,000 | < 450km from Goa-Mormugao Port |
| A-one Gold Pipes and Tubes Pvt. Ltd. | Karnataka | Bellary : 583111 | GP Pipes | Dealer network sales | 72,000 | < 450km from Goa-Mormugao Port |
| A-one Steel India Pvt. Ltd. | Karnataka | Chikkballapur : 561208 | MS Billet | Captive consumption | 200,000 | < 400km from New Mangalore Port |
| A-one Steel India Pvt. Ltd. | Karnataka | Chikkballapur : 561208 | TMT bar | Dealer network sales | 216,000 | < 400km from New Mangalore Port |
| Vanya Steels Pvt. Ltd. | Karnataka | Koppal : 583228 | Sponge Iron | Captive consumption | 150,000 | < 450km from Goa-Mormugao Port |
| A-one Steel India Pvt. Ltd. | Andhra Pradesh | Sri Sathyasai :515212 | MS Billet | Captive consumption | 75,000 | < 450km from Ennore port |
| A-one Steel India Pvt. Ltd. | Andhra Pradesh | Sri Sathyasai :515212 | TMT bar | Dealer network sales | 75,000 | < 450km from Ennore port |

*Source: Chartered Engineer Certificate shared by ASIPL*

**Table 13: ASIPL products and their end-use**

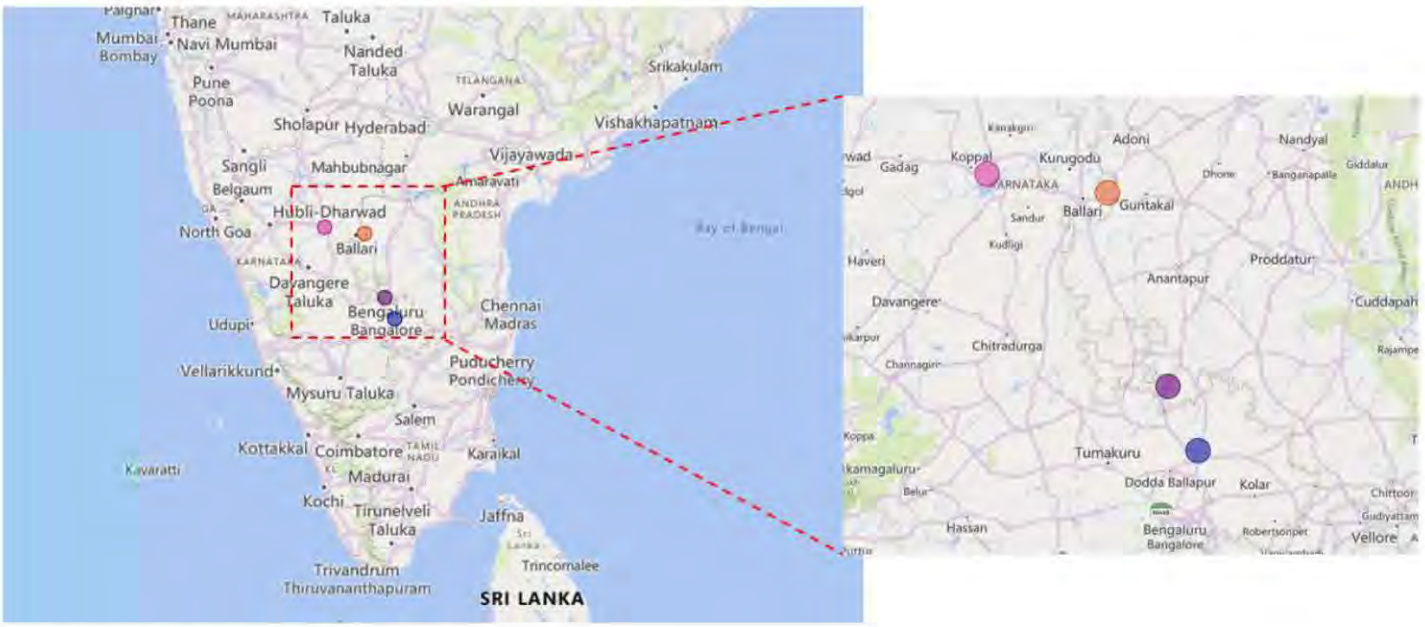
| Products | Product description | End use |
|---|---|---|
| Sponge iron | Directly reduced iron with high iron content | Primarily used in steel manufacturing as a raw material for the production of steel billets and other steel products |
| MS billet | Mild steel billet, a semi-finished steel product | Used as raw material for rolling into bars, rods, and other structural steel products |
| TMT | Thermo-mechanically treated bars with high strength and flexibility | Construction and infrastructure for reinforcement in concrete structures |
| HR coil | Hot rolled coil, steel sheets in rolled form with high ductility | Manufacturing of pipes, tubes, automotive frames, and various industrial equipment |
| CR coil | Cold rolled coil, steel sheets processed at lower temperatures | Used in precision instruments, automotive panels, appliances, and other finished goods requiring a smooth surface finish |
| HR pipes | Pipes manufactured from hot-rolled steel | Applications in oil and gas pipelines, construction, water transport, and structural purposes |
| CR pipes | Pipes manufactured from cold-rolled steel | Suitable for applications requiring high precision and smooth finish, such as automotive exhausts, furniture, and HVAC systems |
| GP pipes | Galvanized pipes, steel pipes coated with zinc to prevent rust | Plumbing, irrigation systems, outdoor construction, and other areas needing corrosion resistance |
| [Coke]/[Metcoke] | Carbonized coal product | Used as a fuel and reducing agent in steelmaking in blast furnaces |
| Ferro silicon/manganese | Alloys used in steelmaking to improve strength and reduce brittleness | Essential for alloying in steel production to enhance strength, hardness, and corrosion resistance |

*Source: Chartered Engineer Certificate shared by ASIPL, CRISIL MI&A Research*

### Location of ASIPL manufacturing units

The manufacturing units of ASIPL are located near major road infrastructure, enhancing logistical efficiency. Additionally, their DRI manufacturing unit is situated in the iron ore-producing region of Bellary, ensuring a steady supply, lower inventory requirement and minimising iron ore transportation costs. For context, producing one tonne of crude steel requires approximately 1.6 to 1.7 tonnes of iron ore. Karnataka produces around ~14% of the Indian iron ore production with Ballary and Koppal district being the major contributors. ASIPL's manufacturing facilities at Ballary and Koppal are located within 100 KM radius of the mineral belt in Ballary and Koppal district including, (iron ore, iron ore fines, iron ore pellets).

**Figure 55: Locations of ASIPL manufacturing units**




Note: map is not to scale, and locations are indicative.

Source: Company website, Chartered Engineer Certificate shared by ASIPL, CRISIL MI&A Research

Please refer to the table below for ASIPL's financials.

**Table 14: ASIPL's key financial metrics and ratios**

| Parameters | FY 22 | FY 23 | FY 24 |
|---|---|---|---|
| **Operating Income** | 27,568 | 31,735 | 38,372 |
| **OPBDIT (EBITDA)** | 1,799 | 2,275 | 1,742 |
| **Net Profit (PAT)** | 1,007 | 977 | 389 |
| **Interest and Finance Charges** | 305 | 696 | 907 |
| **Depreciation** | 190 | 327 | 432 |
| **Total Debt** | 4,600 | 11,260 | 10,425 |
| **Tangible Net Worth** | 2,804 | 3,781 | 4,423 |
| **Average Fixed Asset (Tangible assets only)** | 2,985 | 4,312 | 5,866 |
| **Days Payable** | 26 | 27 | 61 |
| **Days Inventory** | 42 | 67 | 56 |
| **Total receivables** | 2,249 | 3,209 | 4,841 |
| **Days receivable** | 30 | 37 | 46 |
| **Working Capital Days (CCS)** | 45 | 78 | 41 |
| **Cash Flow from Operation (CFO)** | (3,197) | (3,680) | 2,200 |

*Source: A-One Steel India Pvt Ltd*

Set 1 players:

**MSP Steel and Power Ltd. (MSPL):**

MSPL is engaged in the manufacturing of pellets, sponge iron, MS ingot, TMT and structural products. The company also has iron ore beneficiation plant, pellet plant, coal washery, captive power plant and railway siding of 2.4 km.

**Table 15: MSPL's key financial metrics and ratios**

| Parameters | FY 22 | FY 23 | FY 24 |
|---|---|---|---|
| **Operating Income** | 23,420 | 25,604 | 28,739 |
| **OPBDIT (EBITDA)** | 1,577 | 691 | 1,269 |
| **Net Profit (PAT)** | 340 | (537) | 144 |
| **Interest and Finance Charges** | 742 | 772 | 876 |
| **Depreciation** | 545 | 541 | 554 |
| **Total Debt** | 8,293 | 8,039 | 7,807 |
| **Tangible Net Worth** | 6,185 | 5,672 | 5,797 |
| **Average Fixed Asset (Tangible assets only)** | 12,186 | 12,723 | 12,950 |
| **Days Payable** | 50 | 34 | 34 |
| **Days Inventory** | 76 | 71 | 65 |
| **Total receivables** | 693 | 750 | 701 |
| **Days receivable** | 11 | 11 | 9 |
| **Working Capital Days (CCS)** | 37 | 48 | 40 |
| **Cash Flow from Operation (CFO)** | 370 | 140 | 792 |

*Source: Company annual reports and publications*

**Jai Balaji Industries (JBLT):**

Jai Balaji Industries Limited is an Indian steel and iron ore company that manufactures and markets a range of steel products, including long steel products, flat steel products, and value-added products. The company's product portfolio includes TMT bars, wire rods, structural steel, and galvanized steel sheets, among others). Its manufacturing facilities located in West Bengal, India.

**Table 16: JBLT's key financial metrics and ratios**

| Parameters | FY 22 | FY 23 | FY 24 |
|---|---|---|---|
| **Operating Income** | 46,446 | 61,262 | 64,180 |
| **OPBDIT (EBITDA)** | 2,844 | 3,323 | 6,593 |
| **Net Profit (PAT)** | 481 | 480 | 8,691 |
| **Interest and Finance Charges** | 987 | 888 | 727 |
| **Depreciation** | 913 | 979 | 856 |
| **Total Debt** | 31,686 | 8,597 | 4,718 |
| **Tangible Net Worth** | (16,633) | 5,558 | 15,039 |
| **Average Fixed Asset (Tangible assets only)** | 25,980 | 25,921 | 26,784 |
| **Days Payable** | 82 | 70 | 69 |
| **Days Inventory** | 63 | 52 | 60 |

| | | | |
|---|---|---|---|
| **Total receivables** | 1,561 | 2,293 | 2,418 |
| **Days receivable** | 12 | 14 | 14 |
| **Working Capital Days (CCS)** | (7) | (4) | 5 |
| **Cash Flow from Operation (CFO)** | 3,687 | 1,923 | 7,577 |

*Source: Company annual reports and publications*

**Shyam Metallics and Energy Ltd. (SMEL):**

Shyam Metallics and Energy Ltd. (SMEL) was established in 2002 as Shyam DRI Power Ltd when the group expanded its operations to Odisha. The company got its present name in January 2010.

It manufactures sponge iron, billets, TMT steel bars, and ferro alloys and has captive power plants supporting to support majority of its power requirements.

**Table 17: SMEL's key financial metrics and ratios**

| Parameters | FY 22 | FY 23 | FY 24 |
|---|---|---|---|
| **Operating Income** | 48,315 | 62,470 | 66,685 |
| **OPBDIT (EBITDA)** | 11,350 | 4,838 | 6,363 |
| **Net Profit (PAT)** | 7,791 | 2,990 | 3,514 |
| **Interest and Finance Charges** | 90 | 378 | 579 |
| **Depreciation** | 1,196 | 2,078 | 2,187 |
| **Total Debt** | 1,885 | 3,952 | 1,390 |
| **Tangible Net Worth** | 36,466 | 38,503 | 55,620 |
| **Average Fixed Asset (Tangible assets only)** | 16,517 | 20,866 | 25,060 |
| **Days Payable** | 58 | 55 | 92 |
| **Days Inventory** | 99 | 73 | 47 |
| **Total receivables** | 1,039 | 2,287 | 9,089 |
| **Days receivable** | 8 | 13 | 50 |
| **Working Capital Days (CCS)** | 49 | 31 | 4 |
| **Cash Flow from Operation (CFO)** | 6,096 | 4,047 | 1,176 |

*Source: Company annual reports and publications*

**Steel Exchange India Ltd. (SEIL):**

Steel Exchange India Limited (SEIL) is engaged in manufacturing of TMT Rebars. The manufacturing facilities include captive power plant, sponge iron unit, billet unit and rolling mill which are located close to railway line and Vishakhapatnam port in Andhra Pradesh.

**Table 18: SEIL's key financial metrics and ratios**

| Parameters | FY 22 | FY 23 | FY 24 |
|---|---|---|---|
| **Operating Income** | 11,049 | 13,883 | 10,919 |
| **OPBDIT (EBITDA)** | 1,115 | 967 | 947 |
| **Net Profit (PAT)** | 1,165 | (589) | 109 |
| **Interest and Finance Charges** | 881 | 1,056 | 779 |
| **Depreciation** | 238 | 244 | 213 |

| | | | |
|---|---|---|---|
| **Total Debt** | 4,272 | 3,404 | 4,011 |
| **Tangible Net Worth** | 4,911 | 5,172 | 4,396 |
| **Average Fixed Asset (Tangible assets only)** | 10,466 | 10,598 | 10,609 |
| **Days Payable** | 32 | 45 | 49 |
| **Days Inventory** | 87 | 80 | 108 |
| **Total receivables** | 920 | 1,124 | 1,746 |
| **Days receivable** | 30 | 30 | 58 |
| **Working Capital Days (CCS)** | 86 | 64 | 117 |
| **Cash Flow from Operation (CFO)** | (589) | 116 | (1,747) |

*Source: Company annual reports and publications*

**Set 2 players:**

**JSW Steel:**

JSW Steel is the largest steel producers in India and has steelmaking capacity of 28.5 Mtpa in India. It also has steel mill in US (including capacities under joint control).

In India, its integrated steel manufacturing units are in Vijayanagar Works, Karnataka (12 Mtpa), Dolvi Works, Maharashtra (10 Mtpa), Salem Works, Tamil Nadu (1 Mtpa), BPSL plant in Jharsuguda, Odisha (3.5 Mtpa), and JSW Ispat Special Products Limited (1.2 Mtpa) to produce a wide range of flat and long steel products.

**Table 19: JSW's key financial metrics and ratios**

| Parameters | FY 22 | FY 23 | FY 24 |
|---|---|---|---|
| **Operating Income** | 1,187,340 | 1,316,430 | 1,351,510 |
| **OPBDIT (EBITDA)** | 314,170 | 154,040 | 220,460 |
| **Net Profit (PAT)** | 167,020 | 49,370 | 80,260 |
| **Interest and Finance Charges** | 43,810 | 52,210 | 62,210 |
| **Depreciation** | 45,110 | 49,520 | 54,350 |
| **Total Debt** | 504,350 | 551,710 | 588,230 |
| **Tangible Net Worth** | 614,820 | 616,230 | 725,880 |
| **Average Fixed Asset (Tangible assets only)** | 778,840 | 930,225 | 1,010,415 |
| **Days Payable** | 171 | 139 | 131 |
| **Days Inventory** | 88 | 61 | 75 |
| **Total receivables** | 61,460 | 60,000 | 64,980 |
| **Days receivable** | 19 | 17 | 18 |
| **Working Capital Days (CCS)** | (64) | (61) | (38) |
| **Cash Flow from Operation (CFO)** | 211,170 | 124,640 | 37,540 |

*Source: Company annual reports and publications*

**Tata Steel Ltd (TSL):**

TSL is India's first integrated steel company, founded in 1907. The company has 35 Mtpa of capacity globally, of which 21.6 Mtpa is in India. With major production capacities in Jamshedpur, Kalinganagar, and Meramandali, it produces a wide range of flat and long products for various end use industries.

**Table 20: TSL's key financial metrics and ratios**

| Parameters | FY 22 | FY 23 | FY 24 |
|---|---|---|---|
| **Operating Income** | 1,290,525 | 1,290,148 | 1,410,195 |
| **OPBDIT (EBITDA)** | 511,610 | 277,040 | 298,654 |
| **Net Profit (PAT)** | 330,101 | 154,950 | 48,074 |
| **Interest and Finance Charges** | 29,232 | 37,995 | 42,037 |
| **Depreciation** | 54,637 | 54,346 | 59,698 |
| **Total Debt** | 322,755 | 381,790 | 405,574 |
| **Tangible Net Worth** | 1,242,451 | 1,335,187 | 1,361,806 |
| **Average Fixed Asset (Tangible assets only)** | 1,245,699 | 1,268,087 | 1,387,628 |
| **Days Payable** | 160 | 86 | 122 |
| **Days Inventory** | 93 | 75 | 81 |
| **Total receivables** | 32,803 | 33,517 | 16,061 |
| **Days receivable** | 9 | 9 | 4 |
| **Working Capital Days (CCS)** | (57) | (1) | (37) |
| **Cash Flow from Operation (CFO)** | 344,447 | 90,779 | 265,937 |

*Source: Company annual reports and publications*

**Jindal Steel and Power Ltd (JSPL):**

JSPL is part of OP Jindal group and has 9.6 Mtpa crude steel making capacity. The company's key business activities include manufacturing pellets, sponge iron, hot metal, finished steel products, power generation, iron ore and coal mining.

The company has assets spread across Raigarh, Raipur, Angul and Patratu, along with coking coal assets in Mozambique.

**Table 21: JSPL's key financial metrics and ratios**

| Parameters | FY 22 | FY 23 | FY 24 |
|---|---|---|---|
| **Operating Income** | 493,849 | 516,804 | 496,817 |
| **OPBDIT (EBITDA)** | 150,352 | 95,377 | 102,035 |
| **Net Profit (PAT)** | 82,834 | 24,268 | 52,733 |
| **Interest and Finance Charges** | 17,658 | 12,858 | 9,208 |
| **Depreciation** | 22,322 | 21,659 | 22,165 |
| **Total Debt** | 133,258 | 111,143 | 111,203 |
| **Tangible Net Worth** | 399,501 | 399,567 | 446,157 |
| **Average Fixed Asset (Tangible assets only)** | 556,501 | 561,423 | 571,537 |
| **Days Payable** | 84 | 57 | 66 |
| **Days Inventory** | 75 | 47 | 55 |
| **Total receivables** | 12,105 | 11,305 | 21,915 |
| **Days receivable** | 9 | 8 | 16 |
| **Working Capital Days (CCS)** | (0) | (2) | 6 |
| **Cash Flow from Operation (CFO)** | 130,939 | 57,415 | 62,714 |

*Source: Company annual reports and publications*

**Steel Authority of India Ltd (SAIL):**

SAIL was promoted by the Government of India to bring steel manufacturing companies under one umbrella and is amongst the largest steel producers in India.

It operates 5 major steel manufacturing units spread across Chhattisgarh, Jharkhand, Orissa and West Bengal. The company also has special steel plants in India.

The company's cumulative steel capacity is ~20.6 Mtpa.

**Table 21: SAIL's key financial metrics and ratios**

| Parameters | FY 22 | FY 23 | FY 24 |
|---|---|---|---|
| **Operating Income** | 1,036,149 | 1,045,568 | 1,054,607 |
| **OPBDIT (EBITDA)** | 217,441 | 83,804 | 113,745 |
| **Net Profit (PAT)** | 120,150 | 19,031 | 27,331 |
| **Interest and Finance Charges** | 18,914 | 22,485 | 26,545 |
| **Depreciation** | 42,742 | 49,625 | 52,775 |
| **Total Debt** | 176,753 | 311,106 | 363,150 |
| **Tangible Net Worth** | 505,578 | 506,182 | 526,417 |
| **Average Fixed Asset (Tangible assets only)** | 1,179,362 | 1,230,603 | 1,285,200 |
| **Days Payable** | 131 | 84 | 93 |
| **Days Inventory** | 108 | 123 | 145 |
| **Total receivables** | 47,368 | 53,625 | 83,087 |
| **Days receivable** | 17 | 19 | 29 |
| **Working Capital Days (CCS)** | (7) | 58 | 80 |
| **Cash Flow from Operation (CFO)** | 258,578 | (80,771) | 6,110 |

*Source: Company annual reports and publications*

Sehul S. Bhatt

Mr. Sehul Bhatt
Director, CRISIL MI&A Research

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