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ISA Steel Conclave 2024: Peek at medium-term outlook

- **Industry asking for proactive tariffs protection against a potential surge in imports from China and affordable domestic tax environment**
- **Loss of iron ore advantage, met coal security, acceleration of carbon levy in India with CBAM & decarbonisation are medium-term challenges**
- **Value-added steel, use of AI to enhance margin, green steel exports and mandated public green steel demand offer medium-term opportunities**

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Near-term industry concerns: These are (a) contraction of steel margins, (b) need for proactive tariffs protection against potential surges in imports from China, (c) government maintaining affordability of taxation vs potential increase in state taxes.

India steel – a bright spot: (a) Multi-decade growth potential ahead, (b) industry gearing up for delivery of 230m-240mt capacity by FY30, (c) key challenges are synchronised ramp-up of iron ore (50% capacity increase for 300mt steel production) and logistics infrastructure (4t-5t movement of materials per tonne of steel).

New margin challenges in medium to long term: (a) Potential erosion of iron ore advantage as decarbonisation lowers iron ore prices with shift to scrap, (b) pressure on met coal prices with continuing under-investment and India's import dependence.

CBAM challenge – improving appreciation: (a) Accelerate levy of carbon taxes in India to keep tax money in India, (b) lower cost advantage against European peers for downstream products, (c) increased import competition in domestic markets for high-carbon steel, (d) need for guarding Indian industry against disadvantages of capital grant, renewable infrastructure, domestic scrap availability, etc.

Margin-enhancement initiatives: (i) focus on value-added products, (ii) selective exports, (iii) cost optimisation, (iv) need for improving efficiency of capital projects, (v) more use of shared resources (merchant pellet plants, slurry pipelines).

AI can aid margins: CISDI highlighted that it implemented AI/ Big Data at 34 plants in China and has seen margin improve to US$ 10-40/tcs for blast furnace plants and US$ 10-20/tcs for mini mills. Indian industry has also started the journey.

Decarbonisation: India has begun working to develop an action plan to make the steel industry green. It involves (a) window of opportunity emerging for green steel exports, starting with auto/auto-components exports to Europe, (b) government considering the creation of mandated demand and policy support for implementation, (c) 'Run' scenario envisaging investments of US$ 1.2tn-1.3tn with US$ 420bn-430bn of capex.

Margin – a key focus

Near-term pressure from higher exports from China

Indian steel producers are facing a margin compression with a pullback in steel prices that has been offset in raw material prices only partially. This emanated from a surplus in China with weak demand transmitting to the rest of world through higher exports, expected at 120mt (million tonnes) by some Indian players.

Closures needed in China: The India steel team at McKinsey believes the structural solution for this is closing at least 100mt of capacity in China. We believe the problem could worsen over the medium term with another 100mt of new capacity under construction in ASEAN countries, with significant capacity supported by Chinese investments.

India facing risk of surge in Chinese imports: With the Western world as well as several Asian countries working on protection mechanisms for their domestic markets, Indian players are concerned about a surge of imports into India.

Industry asks India government's support

- **Increase in basic customs duty:** Industry is requesting an increase in basic customs duty from 7.5% to 10-12.5% to leave enough margins on the table for the investment. While the government is receptive in evaluating the same, the steel secretary clarified that the Ministry would balance the needs of both producers and consumers.
- **Proactive trade protection mechanism:** The industry is asking the government to proactively put in place trade protection measures even before industry can prove injury from such surge in imports.

Near-term comfort on affordable taxation support

We believe industry fears are somewhat allayed by the central government's stance on the reasonableness of taxation for the sector as we did not sense undue concerns about the increase in state taxes on metals and minerals in our talks with industry participants. For context, the recent Supreme Court ruling clarified that the Mines and Minerals (Development and Regulation) Act (MMDRA Act) did not limit the state's right to levy taxes on metals and minerals.

Medium to long term: New challenges for Indian steel players

With the Western world focusing on decarbonisation, we believe Indian steel players are likely to lose their relative advantage of lower-cost iron ore and are likely to face increasing pressure on coking coal costs with high import dependence.

Iron ore advantage to erode. Focusing on decarbonisation, global industry is likely to increase the use of scrap resulting in lower usage of iron ore and thereby increasing surplus iron ore. This could potentially result in lower global iron ore prices and, in turn, reduce the relative cost advantage for Indian steel players from domestic availability of cheaper iron ore. Some industry participants believe that imported iron ore could compete against domestic ore by 2030 and India could also start to import some iron ore (~20mt) by 2030.

Coking coal under-investment to impact supply: While global demand for coking coal is likely to drop from 1,037mt in CY23 to 870m-900mt by CY35, global seaborne met coal demand could rise from 311mt in CY23 to 340m-370mt by CY35. (Source: McKinsey & Company). New coking coal investments have been significantly impacted with the rising focus on decarbonisation. Even bank funding availability for coking coal projects in the Western world has been impacted. As India targets ramping up steel production, its dependence on seaborne markets for its coking coal requirement will continue to increase. Amid potential under-investment in global markets, Indian players are at a risk of higher coking coal costs over the medium term.

While Indian industry is currently working to improve iron ore security, industry will need to improve its focus on securing coking coal. JSTL has initiated steps with a strategic stake in a couple of global coking coal mines (Illawarra in Australia and pre-development mine in Mozambique), while other Indian producers are looking at strategic agreements (equity, offtake, etc) to work jointly with global miners to encourage investments.

Indian producers have also initiated other steps to get better control over coking coal costs:

- **Diversifying global supplier mix:** Indian industry is looking to source coking coal from multiple geographies to lower its dependence on specific countries and is working on technical aspects to increase flexibility of coking coal blend within blast furnace.

- **Asking for industry collaboration to negotiate better pricing:** While some Indian players are discussing collaborations as buyers to negotiate timing and pricing, this is not easy in our view as coking coal blends as well as requirements vary significantly amid players.

- **Asking for investments in domestic washeries:** To maximise the usage of domestic coking coal in the blend, Indian industry also requests higher investments in washeries within the country. Indian miners are looking to increase capacity from 40m-45mt currently to 70m-80mt over next few years.

Margin enhancement initiatives underway

Industry initiatives broadly fall in two buckets – (a) to improve realisations and (b) to optimise costs.

Improving realisation

- **Focus on value-added products:** Indian industry is working to enhance value-added products through expansion in downstream, and developing new products for Indian industry. Some examples include import substitution products like new automotive grades, head hardened rail, asymmetric rail, electric steel, etc. Even the Indian government is incentivising industry to focus on production of specialty steel and is currently working with the industry to develop a second round of Production-Linked Incentive (PLI) schemes.

- **Export market focus:** Besides the use of export markets to balance demand-supply in India, Indian industry focuses on specific markets for specific products. It targets European markets for downstream and high-end products, and the Middle East and Asian markets for construction steel products.

Cost optimisation

- **Current focus:** Industry is currently focusing on improving efficiencies in plants, optimising raw materials and energy usage, backward integration into pellets, and improving logistics (rail usage, slurry pipeline).
- **Need for improving efficiency of capital projects:** Indian industry is significantly dependent on global suppliers for equipment as well as installation. To lower capital costs, Industry is requesting government policy support to encourage investments in domestic shops from suppliers in Germany/China.
- **Shared resources could improve optimisation:** While industry is focusing on developing a competitive edge with dedicated spur lines, some of the participants highlight the need to adopt shared resources to improve efficiencies further. This could include merchant manufacturing plants, shared slurry pipelines, etc,

AI can become a differentiator to improve margins for steel mills

Steel plants have started experimenting with the use of AI (Artificial Intelligence) and Big Data to improve plant efficiency and clock better margins. CISDI, a UK-based consultancy organisation, highlighted that it has installed complete AI and Big Data solutions at 34 plants in China since its first implementation for Baosteel in 2018. CISDI highlighted that the plants had successfully improved margins to US$ 10-40/tcs (tonne of carbon steel) for the blast furnace-based plants and US$ 10-20/tcs for mini mill.

- **AI across value chain:** AI can play a role in improving the entire steel mill value chain, including operations, predictive maintenance, coal/ fuel/ energy optimisation, market sentiment analysis for coal costs, safety, environment and customer engagement.
- **AI implementation at steel plants means a big culture change:** AI implementation needs level 1 and level 2 sensors to capture all process parameters as it needs to replace experienced operators. AI looks at the whole plant holistically, and not at separate units within the plant, to be effective. In the implementations that CISDI has been driving, it has replaced 40 different control centres with a single and common control centre. This is a big culture change for the steel plant as usually every sub unit operates independently.
- **GenAI is coming up in India:** Indian steel players have indicated that they have started to utilise Analytics AI to Generative AI in parts at this point. It has been used to improve operations efficiency, to identify right material specifications, for customer engagement, for employee engagement as well as for support functions. While JSP has developed J.AI, SAIL has implemented Saarthi in customer engagement.

Long growth runway

Indian steel industry is a bright spot

The Indian steel market is one of few large markets entering a growth phase, besides some markets in South East Asia. It is exactly in the opposite phase of China, which is coming to the end of its growth phase and is attempting to stabilise. Indian steel industry is excited about strong growth momentum ahead which was aptly summarised by equating steel growth with that of civilization, by Amrendu Prakash, chairman of SAIL during the Inaugural Session at the conclave. McKinsey & Company estimates Indian steel demand to grow from 139mt in FY24 to 195m-215mt by FY30 at a CAGR of 6-7%.

Infrastructure development is the key demand driver: Infrastructure pipeline of Rs 1.11tn, identified by Central Government is key to underpin 7-8% of annual demand growth expectations by the steel industry. As India is in a phase of nation building, industry sees growth trajectory as a multi-decade growth runway. Construction and energy are likely to remain as dominant end-use sectors and steel usage is likely to be front loaded.

Long growth runway: Need for infrastructure development is likely to span a long period with requirements to connect rural India to mainstream, and closing gaps with the developed world. This is visible in several indicators.

- **Scaling up per capita consumption:** India's current per capita steel usage of 100kg is significantly below the global average of 230kg. India aims to ramp up usage to 160kg by 2030.
- **Scope to increase steel intensity in construction:** The steel industry believes that steel usage in construction can increase by 30-40% with more steel-intensive construction. Currently India uses a higher proportion of cement in construction – 3t vs the global average of 2.2t for every tonne of steel.
- **Increase in urbanisation:** India aims to raise urbanisation from 36% in FY22 to more than 50% of 1.7bn population by FY35. As steel usage intensity is significantly higher in urban India, this is another driver to underpin steel demand growth ahead.

Key challenges for growth

To support infrastructure development and ramp up steel usage to 160kg per capita, the Indian government wants the steel industry to ramp up capacity from 180mt in FY24 to 300mt by FY30. We understand from interactions that Indian industry is positioning itself to deliver at least 230m-240mt of capacity, with the announced plans to add steel capacity of 60m-80mt over the next decade. The key challenges that the steel industry sees for delivering on this growth runway are skilled manpower, raw materials, and logistics.

Iron ore ramp-up needs to synchronise

According to the discussions during the Conclave, Indian industry is currently self-sufficient for its iron ore requirement and could see this self-sufficiency extend to FY35 if most of the auctioned mines come under operation.

Participants highlighted that to deliver Indian steel industry's growth requirements of 300m-500mt over the next couple of decades, iron ore production will have to increase by 50-150% to 500m-800mt. Key requirements to deliver on this growth include:

- **Need for exploration:** While India has 6.4bn tonnes (bnt) of economically minable reserves today, or the equivalent of more than 20 years of reserve life and a resource base of 35mt, the reserves base needs to be expanded. As India has not fully explored potential even for prolific areas, there is a good possibility to expand needed resource base with focused exploration.

- **Beneficiation:** While India's iron ore industry has the necessary resource base, only 23% of resources are of adequate grade for direct use in blast furnaces. While Indian industry is currently relying on high-grade ores, the industry will have to move towards the use of beneficiation to upgrade ore grade and lower impurities (current alumina content at 5-7% is significantly higher than under 2% requirement for usage in blast furnace). It is important to note that a 1% increase in alumina leads to 2-2.5% increase in coke rate and loss of 1-1.5% productivity.

  Indian industry is planning to grow its beneficiation capacity from 135mt-140mt currently to 170mt by 2030. Current capacity is not fully utilised. Conventional beneficiation has had limited success in India so far with specific challenges with the use of Indian quality of iron ore. Industry needs to use more slurry pipeline and pelletisation capacity and evolve the right technical solutions to succeed in using beneficiation technology.

- **Clarity on mining auction calendar:** India needs to define the mining auction calendar for the next five years or so to give industry enough visibility on available mining areas and allow it to choose the right mines without undue competition.

- **Mining clearances:** Industry needs to obtain requisite mine clearances to expand production capacity. The process takes significant time to complete public consultation processes. While industry participants expect the Odisha Mining Corporation to increase the production limit to 45m-50mt (from 36mt) for its existing 11 mines, we see the need for NMDC to increase the production limit to 100mt by FY30 (from c52mt currently).

- **Mechanisation:** The Indian mining industry needs to improve the use of automation and mechanisation in mines to deliver more consistent production even through monsoons and lower the cost of production.

- **Evacuation infrastructure:** Some of the challenges that need to be addressed are connectivity of rail infrastructure to mines, connectivity of state roads between mines, and the nearest rail tracks. Industry is asking for more coordinated approaches between the Centre and States to address these challenges.

Logistics development needs to accelerate

Logistics costs in India at 16-18% of steel prices is significantly higher than the global average of 10%. Logistics development needs to optimally connect more than 2,000 steel plants with 275 iron ore and manganese mines. Further logistics requirements are likely to grow significantly as the industry grows steel production with close to 4.5t of total material movement for every tonne of steel production.

Industry is looking to the government for support to improve logistics particularly improving evacuation infrastructure at mines and the availability of multi-modal infrastructure (road, ports, waterways, slurry pipelines). While PM Gati Shakti has improved clearances for logistics projects, the next ask from industry is to improve execution of these projects. Industry also sees the need to improve the availability of skilled manpower.

Industry also needs to specifically work on optimising outbound logistics costs, which is currently as high as inbound logistics costs despite being a third of volume. Industry is currently impacted by mismatches in transportation capacity with product mix. Industry needs to move to integrated planning of inbound and outbound logistics for further optimisation.

CBAM challenge – improving appreciation

CBAM likely to advance levy of carbon taxes by other countries as well

The Carbon Border Adjustment Mechanism (CBAM) in Europe is expected to levy a differential tax to equalise the cost of carbon. Specific points which have a potential to impact Indian steel industry include:

- **Can accelerate implementation of carbon taxes even in India:** The CBAM is likely to advance implementation of carbon taxes, particularly for exporting countries to keep benefit of taxes paid in exporting country.

- **Potential to impact exports of value-added steel products:** The Indian steel industry has been focusing on European markets for the export of downstream and value-added products. This accounted for nearly half of India's exports in FY24. As CBAM is attempting to levellise costs on the grounds of carbon content, Indian exporters may lose their cost advantage.

- **Higher import competition from high-carbon steel products:** As European markets close their borders for high-carbon products, there could be potential leaks to nearby countries not having similar border taxes. This could potentially increase imports into India from Asian exporters.

- **India needs to guard industry against several disadvantages:** European players now have relative advantages for transition – (a) capex funding grant of 40-70%, (b) renewable infrastructure development, (c) green hydrogen development, (d) high availability of domestic scrap, and (e) policy support.

- **Scrap equalisation mechanism is important:** Scrap availability as a percentage of steel demand is high in Europe (50%) and US (70%) and can become a source of relative disadvantage for level playing fields. ResponsibleSteel production standards suggest that scrap equalisation should be done on different weights across different countries to ensure level playing fields. Scrap generated out of high carbon route should have some form of penalty for embedded carbon. Equalisation weight should differentiate between pre and post consumer scraps.

Decarbonisation

India is targeting net zero for its steel industry by 2047. H. D. Kumaraswamy, Union Minister of Steel and Heavy Industries, in his address at the event 'Greening Steel' pathway to sustainability, emphasised that the need for sustainable, low-carbon development in the steel sector is no longer a choice but an essential obligation. The conference highlighted the following considerations to support decarbonisation of the industry.

Learnings from the Western world

- **Key investment drivers for industry:** Market demand and renewable energy infrastructure to support decarbonisation, technology funding, policy support and raw material availability.

- **Support of all stakeholders:** Decarbonisation is not the problem of the steel industry alone, all stakeholders need to come together to find a balanced solution.

Government support is essential

India recently prepared a report to develop an action plan to decarbonise the steel industry based on the recommendations of 14 task forces involving industry participants. The government is conscious of several requirements – (a) creating a mandated demand, (b) supporting public procurement incentives, (c) supporting decarbonising technology, (d) enabling/supporting the development of renewable infrastructure including green hydrogen, biochar, etc, (e) developing scrap collection infrastructure, (f) incentivising steel plants to move towards green steel implementation, and (g) developing standards for implementation.

Drivers of green steel demand in India

Initial industry estimates suggest a small 4m-5mt of low-emissions or green steel demand by 2030.

Export-oriented green-steel demand

We believe the initial trigger for green-steel demand is from exporters to Europe, particularly in auto and auto-component industry trying to capitalise on 'green' premium. Industry participants indicated 'green' premium of 20%-30% over steel prices at this point. If India advances its decarbonisation, India could capitalise and lead on emerging windows of opportunity. Potential demand drivers for green steel are as follows:

- **Auto industry:** Global auto manufacturers with plants in India will require green steel to meet their net zero commitments. For example, Volvo recently announced its plan to set up a truck plant, which would be the second largest in its global portfolio. Volvo has committed to having 50% of trucks with zero carbon emissions by 2030 and net zero by 2040.
- **Bearings industry:** With the decarbonisation of the steel industry, the bearings industry will likely be dependent on the steel industry to continue its exports to Europe. As 80% of emissions for bearings depends on the use of steel, the availability of green steel in India is important for them.

Potential for developing domestic green steel demand

While initial higher costs during the adoption phase could limit the use of green steel by private players in the short to medium term, there would be a need to create mandated demand to develop the ecosystem.

- **Green public procurement mandate** for key infrastructure projects if adopted could help stimulate demand and develop the ecosystem. Government procurement accounts for 40% of steel demand in India.
- **Electric 4Ws** with initial adoption from mid-premium segment (Sports/ SUV/ Sedan).
- **Automotive markets** may adopt low carbon steel solutions to lower the usage of high-carbon aluminium.
- **Premium white goods** with energy-efficient ratings and advanced makes.
- **Renewables and storage** are likely to be in a position to afford high premium with low steel intensity and positioning with green attributes. Wind turbine manufacturing can adopt green steel as well.
- **Luxury real-estate projects:** The adoption of major real estate projects in the luxury segment and commercial offices, with high green building ratings.

Debcarbonisation investments

The Indian steel industry accounts for 12% of carbon generation in India. The steel industry generates 50-55% of its carbon emissions manufacturing iron and 20-25% making steel. The industry aims to become net zero by 2070. The Indian Steel Association has appointed AT Kearney as consultants to suggest how to transition to green steel. AT Kearney has developed the ‘Run’ pathway, which minimises the cost of transition while delivering on India’s commitment to net zero by 2047.

Emission reduction path: The scenario envisages emission reduction of 10-15% by 2030, 75-85% over 2040-50 and 100% by 2070.

Cost of transition: The estimate of US$ 1.2tn-1.3tn, includes capex of US$ 420bn-470bn and balance as opex.

Increase in steel production cost: The report highlights potential 25-28% increase in levellised cost of steel production.

Evolution of capacity mix and investment focus to drive decarbonisation under the 'Run' scenario, as developed in the report, is captured in the tables below.

Fig 1 – Evolution of capacity mix under 'Run' scenario

	Steel capacity	Capacity mix (%)			
Years	Million tonnes	BF-BOF	DRI-EAF (Coal)	DRI-EAF (Natural gas)	Scrap based EAF/ EIF
2024	162	48%	33%	6%	11%
2030	270-280	50%	21%	12%	17%
2050	500-510	48%	20%	13%	20%
2070	780-790	42%	13%	19%	27%

Source: Indian Steel Association, BOBCAPS Research, Notes: BF: Blast Furnace, BOF: Basic Oxygen Furnace, DRI: Direct Reduced Iron, EAF: Electric Arc Furnace, EIF: Electric Induction Furnace

Fig 2 – Decarbonisation investment focus for steel industry

Period	Decarbonisation investment focus
Till 2030	Focus on efficiency and renewables
2030-50	Uptake in injection of green hydrogen in BF-BOF and DRI-EAF (natural gas)
2030-50	Initiation of CCU with options to utilise in green methanol, urea
2050-70	Continued focus on CCS beyond 2050

Source: Company, BOBCAPS Research, Notes: BF: Blast Furnace, BOF: Basic Oxygen Furnace, DRI: Direct Reduced Iron, EAF: Electric Arc Furnace, CCU: Carbon Capture and Use, CCS: Carbon Capture and Storage

Near-term steps to reduce carbon footprint gradually

- Use of scrap and renewable energy in combination with storage.
- Use of coke oven gas for injection in blast furnace instead of power generation. This is a viable alternative for both BF-BOF and DRI-EAF, reducing carbon emissions by 8% and increasing productivity by 20%. In future, even top gas can be introduced in blast furnace.
- Hydrogen-rich injection into BF can reduce coke usage by 0.45-1.1kg per thm (tonne of hot metal)
- Coal-based DRI improves readiness to go towards increase in hydrogen usage as syngas contains 48% hydrogen.
- Small-scale DRI plants need to shift from rotary to vertical shaft to allow the switch to natural gas. At natural gas's cost of US$ 7-8/MMBtu delivered at the plant, these DRI plants can switch to natural gas instead of coal.
- Natural gas is not an easy substitution for coal decarbonisation given high capex and associated geopolitical uncertainties.

Breakthrough technologies to take time to implement

While global industry is working on breakthrough technologies, the key question at this stage is the timeline of its commercial viability. At this point, the use of hydrogen can increase steel production costs by Rs 15k/t, which is not affordable for consumers.

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