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Sectoral Initiatives: Steel case Study

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The EU – India Steel dialogues were envisaged to take the work on the Global Climate Alliance forward from the perspective of different sectors. The GCA proposal entails a crucial recommendation on the creation of sectoral working groups to align decarbonisation/transformation pathways for certain sectors, instead of attempting to undertake economy-wide decarbonisation. These working groups would be based on deep collaboration, with an aim to achieve global carbon neutrality in the chosen sector, and in line with the 1.5°C Paris Agreement target. Such working groups can provide policy certainty to national markets, and the benefits can potentially spill over to trade between countries, especially in tradable sectors.

Different sectors need different, specific actions and support to achieve transitions in line with climate targets. The challenges are particularly high in globally-traded, hard-to-abate industrial sectors in which competition is acute. For this reason, the steel sector is a key case study for implementing the GCA via a deep collaboration process. Thus, steel was chosen as a pilot sector to understand pathways for the sector, as an illustration for the Global Climate Alliance proposal going into the G20 process. Contributing to about 10% of global CO2 emissions makes the sector globally important, while its high trade intensity underscores the need for any national choice to also be assessed in the light of its global effects and interactions.

The EU-India Steel Dialogues held two sessions. It saw participation from major steel companies of India and Europe, the steel associations, policymakers on both sides, MDBs and other relevant stakeholders like the International Energy Agency (IEA).

This brief report outlines the findings from initial workshop discussions. The key results include:

(i) Emphasis on the importance of identifying **ambitious and transparent transition pathways, including establishing a standardised definition of low-carbon steel and the target share of primary low-carbon steel production and steel recycling**, while recognising differentiated rates of change in the short-term for the global North and the global South;

(ii) The importance of **credible and effective policies in national markets**, including both price-based and non-price-based climate change mitigation instruments;

(iii) The crucial need to transform industries, a key role for **international climate cooperation and partnerships that can address financing challenges**, investments into new technologies, and technology research and development including in carbon capture and storage (CCS) and green hydrogen.

Ambitious and transparent transition pathways

Pathways to address the carbon emissions of steel by 2025/30 will need to combine at least three levers:

1. **Replacing small scale and very inefficient plants** would quickly reduce emissions. Small scale plants currently make up 30% of Indian production. However, due to links to medium, small, and micro industries (MSME) and local communities, this would require a clear transition strategy for funding modernisation or developing alternative economic opportunities.
2. **Increasing the share of recycled scrap reused in steel production** would reduce carbon intensity, as scrap-based steel making only requires a fraction of the energy and carbon emissions of primary production. However, although the EU and USA (and to some extent China) have significant sources for scrap available due to their historic steel use, this is less available in India.

3. **Shifting to near-climate-neutral steel production processes** is key to achieving climate neutrality. In the short-term, this is more challenging than the other three options due to the newness of these technologies.

Increasing share of new BF plants reduces average carbon intensity, as new plants are more efficient. The larger the growth of production capacity, the higher the reported improvement and the higher the emissions. An improvement of the emissions intensity indicator will not necessarily reflect an overall improved outcome. However, to fully achieve climate targets, only two of these three options are fundamental: (i) increasing the share of near-climate-neutral steel, and (ii) reducing the share of very inefficient (small scale etc.) primary production capacity. Therefore, these two effects are a priority for policy support measures. Policy supporting these changes would not only ensure that desired carbon emissions reductions are achieved but could also contribute to a modernisation of industry and reduce local environmental impacts. It might also be warranted to focus on international commitments and metrics on these two developments.

An essential next step, thus, is the development of scenarios with modernisation of steel production and steel use in India. With segmented targets for this decade as a short-term scenario, along with medium term and long-term scenarios for the industry. The segmented targets should encompass the current diversity in the ecosystem of the Indian steel industry, with targets for the MSMEs and large players being separate but, potentially, with even more granularity within the MSMEs. International experience suggests that such tangible scenarios are a necessary first step for the iterative co-design of a suitable policy framework and business plans.

Current key national policies

A portfolio of several policy instruments will be required to enable steel companies and consumers to shift to near-climate neutral production processes, enhance the share and quality of recycling, and enhance material efficiency. When choosing policies, countries may want to consider opportunities to cooperate by aligning instruments or working together on effective implementation as part of a sectoral cooperation under a climate alliance or climate club. The current policy instruments being wielded in India for steel sector decarbonisation are outlined in the table below:

Chart 1: Steel production in India and the chronology steel sector relevant policies

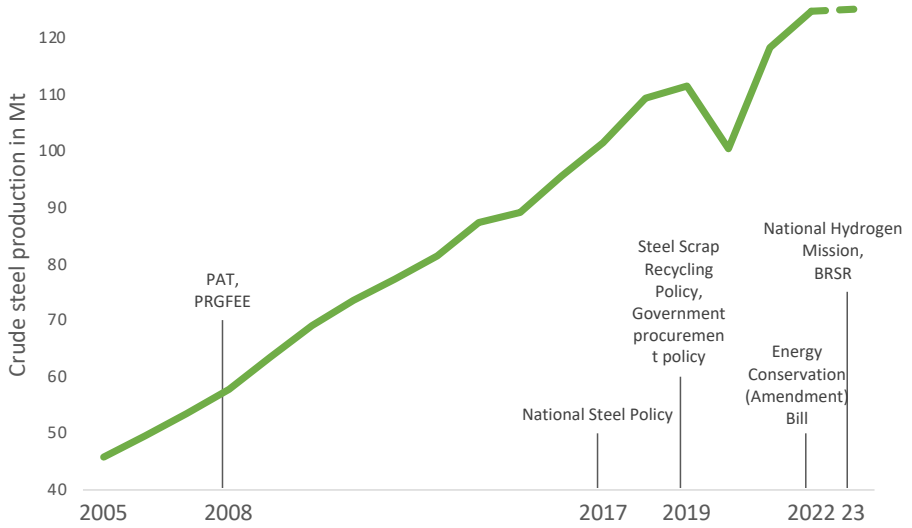

Table 1: Existing policies relevant to the steel sector

Country	Steel-Specific Policies	General Policies also Relevant to Steel
India	1) National Steel Policy 2) Steel Scrap Recycling Policy 3) National Hydrogen Mission 4) Government procurement policy[i]	1) Energy efficiency Emission certificates (PAT) 2) Partial Risk Guarantee Fund for Energy Efficiency (PRGFEE)

A brief explanation of the existing policies relevant to the steel sector in India:

Partial Risk Guarantee Fund for Energy Efficiency (PRGFEE)[ii]

- Financial instrument to promote energy efficiency

Perform Achieve and Trade (PAT): Energy efficiency trading scheme[iii]

- 2012: Frist Cycle of the PAT scheme
- Bureau of Energy Efficiency (BEE) published a list with all companies under the PAT scheme
- Specific energy consumption as TOE (tonne of oil equivalent) per tonne of product
- Covers over 150 Iron & Steel Units in India as well (threshold of 20,000 tonnes TOE per year)
- If a company stays below its targets set by the BEE they are given Energy Savings Certificates[iv]
- These Certificates can be traded: Equilibrium price is supposed to be determined in a doubled-sided closed auction[v]
- Those TOE which are supposed to be reduced by the PAT scheme are however not directly proportional to tons of CO2. The goal of PAT is foremost to reduce the energy intensity.[vi]

National Steel Policy

- Expansion of steel production up to 255MT of crude steel in 2030
- Crude steel production capacity to attain 300 million tonnes
- Enhancement of steel consumption
- While also reaching the INDC for UNFCCC
  - 2015: Intended Nationally Determined Contributions (INDC) for reducing GHG emissions in iron & steel sector CO2 emissions of
    - 2.2 – 2.4 tonnes per tonne of crude steel in the Blast Furnace-Basic Oxygen Furnace (BF-BOF) route and
  - 2.6 – 2.7 tonnes per tonne of crude steel in Direct Reduced Iron in Electric Arc Furnace (DRI-EAF) route by 2030[vii] 2019:

Steel Scrap Recycling Guidelines[viii]

- Reduce, Reuse, Recycle, Recover, Redesign, Remanufacture
- Set of guidelines put in place to promote a circular economy
- Framework of policies that Scrap Processing Centres have to adhere to as per social and environmental standards
- An explicit policy to reduce GHG emissions
- Describe responsibilities of all parties involved (for example producers should provide information on the dismantling of vehicles)

Government procurement policy[ix]

- Policy for providing preference to domestically-produced steel
- The policy mandates that domestically manufactures iron and steel products with a minimum of 15 – 50% value addition in India should be given preference in Government procurement
- Not only for steel, but also for manufacturing goods needed to produce steel
- There is no mention of any ecological reason for implementing this policy

The Energy Conservation (Amendment) Bill

- Introduction of a carbon trading scheme
- Obligation for designated consumers to use non-fossil fuels[x]

National Green Hydrogen Mission

- Roadmap for the production, usage and export of Green Hydrogen
- Aimed, firstly, at production processes that already use hydrogen (refineries, fertilizers and city gas sectors)
- Prospect of support for pilot projects and future instruments supporting the usage of green hydrogen in the steel sector[xi]

Business Responsibility and Sustainability Report (BRSR)[xii]

- Reporting of ESG standards of the top 1000 listed entities
- Applicable to the Top 1,000 listed companies by market capitalisation (expected to apply to all companies in subsequent years)
- Enhancement of the BRSR (introduced: 2021)
- Reporting made mandatory from FY2022-23
- Companies have to specify the following in their BRSR report:
  - Metric tons of CO2-equivalent emissions per year
  - Provide the answer to this: "Does the entity have any project related to reducing Green House Gas emission? If Yes, then provide details."[xiii]

Potential synergies and new policy levers for accelerating green steel in India

Carbon pricing is designed to ensure that consumers pay for incremental carbon costs and hence are also prepared to pay alternatively for the incremental costs of clean processes. A carbon pricing mechanism will only be effective, however, if carbon leakage concerns are addressed.
Ensuring effective carbon pricing while avoiding carbon leakage risks can be achieved by:

- A mandatory carbon tax or an emissions trading system (ETS) with full auctioning combined with an effective carbon border mechanism.
- A tax system or ETS system with rebates at the benchmark of the best available technology, in combination with a climate contribution levied on all domestic and imported materials and waived on exports (the standard WTO-approved border adjustment).

Green Public Procurement could require the use of near-zero carbon produced materials. With limited fraction of overall demand, it may primarily trigger a resource shuffling to allocate steel scrap-based production towards publicly procured (often construction) projects. So, it would trigger focused use of steel scrap to meet these requirements, rather than allocate scarce scrap to all BF processes, where 20% scrap share enhances energy efficiency. Green Public Procurement could alternatively require the use of primarily

produced near-climate-neutral materials – but would then result in incremental costs that sub-national entities may be reluctant to bear. Also, it may be unclear if this provides for a sufficiently credible demand to trigger private investments.
Green Public Procurement can also be designed to encourage a reduced volume of materials with high carbon / energy footprint (steel, cement, plastics), to encourage supply chains, especially in construction, to coordinate and unlock material saving potential from better building specifications, design, construction and quality control.

Carbon contracts for difference (CCfD) can be issued by governments to cover incremental production costs during investment and/or operation of near-climate-neutral production processes and to ensure investors in green technologies against uncertainties from future policy developments. A CCfD program for the Indian steel sector, supported by the EU, would target the Indian domestic green steel market. It would not involve market design in the EU to provide incentives for Indian steel producers to export to the EU. For the success of such an instrument in India the policies for the steel sector in, addressing scrap, recycling and hydrogen production, will be required. The funding would also target the MSME steel sector in India, which has a large share in the industry and will be pivotal in the transition for emissions as well as for a just transition.

Enabling environment with near-climate-neutral production processes, via which come key enabling elements, like renewables at large scale and competitive cost; policies and infrastructure for enhanced recycling and material efficiency.

International climate cooperation and partnerships
The high cost of capital for new technology investment is a crucial barrier to transition. Carbon border measures, as discussed above, will not impact inefficient plants from which the steel production is unlikely to be exported. Therefore, international financing solutions to reduce the cost of capital are a top priority. International financial support could be provided through a variety of mechanisms to support countries or companies to realise the transition to a near-climate-neutral steel sector.

Concessional finance and risk sharing instruments can, in principle, be made directly available to companies. To ensure alignment with the climate objective, access to this finance would need to be restricted to qualifying projects that commit to disclosure.

International Carbon Contracts for Difference could potentially be designed jointly by a Global South host country and by a supporting country in the Global North or an international financial institution. Sharing risk and costs in this way would allow the public partners to provide an attractive and credible investment framework for near-climate-neutral production processes.

An Enabling environment, with financial commitments will only be feasible in the context of ambitious and transparent commitments, and credible national policy frameworks. Alignment by partner countries with the EU steel sector roadmap and policies would likely help to facilitate EU financing.

A few other important aspects to consider are:

Steel excess capacities may need to be addressed to avoid economic risks and political conflicts, if large surplus volumes by individual countries are "dumped" in other markets. This is a highly controversial topic that needs to be addressed jointly by all major steel producers, for example in the established format of the global forum on steel excess capacity. It may be preferable to treat this highly controversial – and hardly ever satisfactorily addressed – subject in a separate process to avoid it dominating any discussions within a climate alliance/club.

The lower historic steel demand volumes in a country, the less scrap it will collect. Hence the higher the share of primary production of materials that is required. With investment and operational costs and emissions for primary steel production higher than for recycling, using, for example, an electric arc furnace, has always put developing countries at a cost disadvantage. This cost disadvantage will increase with a shift to near-climate-neutral primary steel production with higher operational costs. However, it can decline if material efficiency and recycling are increased and costs for renewable energy decline as well.

The definitions of green steel and potential rise in demand for green steel will also create other tensions if, in the initial stages, much of that green steel is being made via scrap and EAF. The dynamics of scrap availability and the export restrictions of scrap will need to addressed and discussed, potentially in a forum like the climate alliance.

Box1: Insight on EU steel

European steel production is currently 153 (EU27) million tons (2021) or 8% of global steel production. But it is a much smaller contributor to the sector's global emissions at [5.5%: global steel emissions 3.7 Gt CO2; EU steel emissions – 0.2 Gt CO2] mostly due to a 43% share of secondary steel in the EU crude steel production mix vs. a 28.9% mix of secondary steel in global steel production. Under the EU Green Deal and the FitFor55 policy package, the steel sector is expected to deliver a 55% emissions reduction by 2030 as compared to 1990 levels, and net-zero by 2050.

The main transition pathways being adopted in Europe are (i) the circular economy with scrap being used for 46% of total production, (ii) smart carbon usage through the integration of carbon capture and (re-) use (CCU) or carbon capture and storage (CCS), and (iii) carbon direct avoidance (CDA). To deliver the full transition, by 2050 total costs of production will rise by 35%-100% per tonne of steel as a result of the costs of using new technologies and more energy. Funding support of up to €60 billion will be needed. Additional energy requirements will be about 400TWh of CO2-free electricity in 2050 – about seven times what the sector purchases currently. An international level playing-field for competition is crucial.

Box 2: Insight on India steel

The current Indian steel production is 118 million tons, or 6% of global production. The National Steel Policy adopted in 2017 sets a production target of 300 million tons by 2030. At the same time, per capita consumption of steel in India remains low. Of current capacity, blast furnace is 45% and is the focus of expansion, while electric arc processes are 25% of current capacity, and industrial furnaces are 30%.

India's steel decarbonisation roadmap has several phases: (i) until 2030, work on efficiency – targeting an emissions intensity reduction of 20%;(ii) from 2030 to 2040 new technologies will be used and old plants phased out, targeting an emissions intensity reduction of 40%; and (iii) full decarbonization from 2040 onwards with the adoption of climate-neutral technologies.

Indian steel producers are testing CCUS in pilot projects. However, the lack of a clear global definition for low-carbon steel, green labelling and supportive policy instruments are a barrier. To deliver the full transition, power system investments to generate abundant CO2-free electricity will be crucial.

Source: World Steel Association.

ENDNOTES

ii 'Policy For Providing Preference To Domestically Manufactured Iron And Steel Product In Govt Procurement (DMI&SP) Policy ', Ministry of Steel, Government of India, https://steel.gov.in/policies/policy-providing-preference-domestically-manufactured-iron-and-steel-product-govt (Bureau of Energy Efficiency (Ministry of Power), n.d.)

iii (Bureau of Energy Efficiency, 2023), Ministry of Steel, Government of India, 2023 https://steel.gov.in/energy-environment-management-steel-sector

iv (Mediratta, n.d.)

v (Mediratta, n.d.)

vi World Energy & Climate Statistics – Yearbook 2022,(Enerdata, 2023): https://yearbook.enerdata.net/co2/toe-emissions-co2.html

vii (Ministry of Steel, 2017)

viii (Ministry of Steel, 2019b).pdf or India's 'Steel Scrap Recycling Policy 2019', https://www.indiafilings.com/learn/steel-scrap-recycling-policy-2019/

ix (Ministry of Steel, 2019a)

x (Ministry of Law and Justice, 2022) & (Rajeev, 2022): 'Energy Conservation Bill 2022: Implications and next steps', Dhruv Rajeev, Economic Times, 28 December 2022, https://economictimes.indiatimes.com/industry/renewables/energy-conservation-bill-2022-implications-and-next-steps/articleshow/96562493.cms

xi (Ministry of New and Renewable Energy, 2023)

xii (Bedi & Singh, 2021)

xiii Securities and Exchange Board of India (2021) – BRSR Circular No.: SEBI/HO/CFD/CMD-2/P/CIR/2021/562 An-nexure I.

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