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Carbon pricing meets raw materials

CBAM's impact on Indian industries

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FORWORD

Global trade and industrial competitiveness are undergoing a fundamental shift as regulators worldwide increasingly integrate climate considerations into business operations and supply chain governance. Emerging rules on carbon disclosure, environmental due diligence, sustainable finance and cross-border accountability are reshaping how businesses produce, report and trade. As these frameworks evolve across the EU, UK, China and other major economies, companies are required to demonstrate credible emissions performance and transparent verification practices as a condition of participating in global value chains.

Within this evolving regulatory landscape, the European Union's Carbon Border Adjustment Mechanism (CBAM) represents a particularly significant development for India. By linking international trade to verified carbon intensity, CBAM signals a decisive move toward carbon-aligned commerce and places new operational expectations on emissions-intensive sectors. CBAM is a catalyst for Indian exporters, compelling stronger monitoring and reporting systems, accelerated decarbonization and more strategic integration with emerging global norms. As climate and trade policy become increasingly intertwined, CBAM marks a pivotal moment for Indian industry to align competitiveness with the low-carbon transformation.

Against this background, the Indian Chamber of Commerce (ICC) is organizing the 16th edition of the India Corporate Governance and Sustainability Vision Summit and Awards at New Delhi on 13 March 2026. This event aims to explore various aspects of corporate governance, including implementation challenges and strategies for achieving success in climate change governance and sustainability.

ICC, along with EY as knowledge partner, confers the Corporate Governance and Sustainability Vision Awards to various Indian businesses to recognize and honor their significant efforts toward creating a sustainable development model for society at large.

This knowledge report takes a deep dive into the challenges faced by Indian industries with the evolving landscape of carbon pricing and global trade policies, particularly CBAM. Trust you will enjoy reading it.

Dr Rajeev Singh
Director General,
Indian Chamber of Commerce

Chaitanya Kalia
Partner & National Leader, CCaSS, EY India

Saunak Saha
Partner CCaSS,
EY India

EXECUTIVE SUMMARY

Global carbon emissions remain structurally high despite accelerating clean energy deployment, with emissions growth increasingly concentrated in emerging economies such as India. This evolving emissions landscape — characterized by regional divergence, heightened carbon transparency and the growing use of trade-linked climate instruments — forms the macroeconomic context for the European Union's Carbon Border Adjustment Mechanism (CBAM). By embedding carbon costs directly into market access conditions, CBAM represents a structural shift in global trade governance, linking competitiveness to verified emissions performance rather than production costs alone.

For India, CBAM disproportionately affects carbon-intensive, trade-exposed sectors — most notably steel, aluminum, cement and fertilizers — through increased landed costs, margin compression and stringent monitoring, reporting and verification (MRV) requirements. Sectoral analysis indicates heterogeneous impacts: steel and cement face the most acute competitiveness pressures due to high process and fuel-related emissions; aluminum faces moderate but persistent risks linked to coal-based power dependence and data gaps; fertilizers are relatively less affected but remain vulnerable under broader economy-wide adjustments. Beyond direct trade effects, CBAM generates indirect impacts across energy systems, downstream manufacturing and household welfare.

At the same time, CBAM also creates strategic opportunities. By altering relative price signals, it incentivizes export diversification, low-carbon production pathways and carbon differentiation as drivers of revenue growth. Evidence from India's metals and mining sectors suggests that reallocating exports toward select non-EU markets, scaling renewable-linked and circular production and improving MRV credibility can enhance unit revenues and margin resilience even under tightening global carbon constraints. These dynamics underscore that CBAM is not merely a compliance burden but a catalyst for structural reorientation in India's industrial and trade strategy.

India's policy response — anchored in the Carbon Credit Trading Scheme (CCTS) — is therefore central. By internalizing carbon pricing domestically, retaining revenues within the national fiscal system and recycling proceeds toward transition support and clean investment, CCTS offers a mechanism to convert CBAM-induced external pressure into a managed, development-aligned transition pathway.

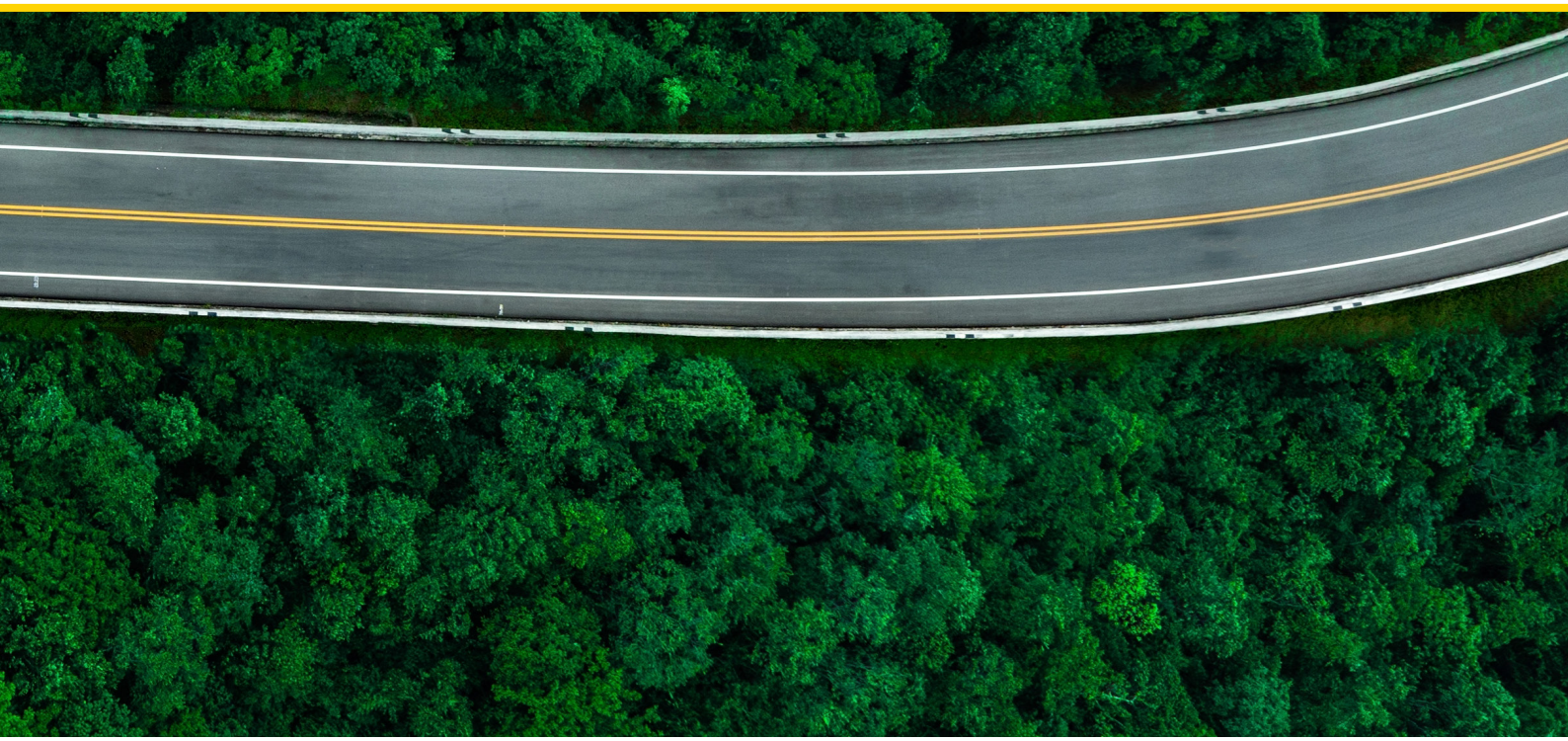
01 The global carbon emission landscape

The current carbon emissions landscape is characterized by persistent absolute emissions, even as clean energy expansion accelerates. According to the International Energy Agency (IEA), energy-related CO emissions reached a record high of 37.8 GtCO in 2024, increasing by 0.8% since last year.[1] Emerging and developing economies accounted for most of the net emissions growth, while advanced economies reduced emissions marginally. China remained the world's largest emitter in absolute terms, but its emissions growth moderated to 0.4% compared to last year, partly due to massive additions of renewable capacity and a slowdown in energy-intensive industrial output. In contrast, India recorded the fastest emissions growth among major economies, with a 5.3% increase in absolute emissions compared to last year, driven by rapid economic expansion, infrastructure development, rising electricity demand and prolonged heatwaves that increased reliance on coal-based power generation. At the same time, clean energy technologies, namely solar PV, wind, nuclear, EVs and heat pumps, have collectively reduced 2.6 GtCO of carbon emissions in 2024, according to the IEA[2], signaling a structural but insufficient shift toward low-carbon systems. The IEA estimates that approximately half of the global emissions increase in 2024 was attributable to extreme weather conditions.

CO2 emissions*(Mt CO2) **Growth rate**

	2022	2023	2024	2025	
World	36819	37270	37566	1.2%	0.8%
United States	4717	4567	4546	-3.2%	-0.5%
European Union	2683	2455	2401	-8.5%	-2.2%
China	12013	12552	12603	4.5%	0.4%
India	2691	2836	2987	5.4%	5.3%

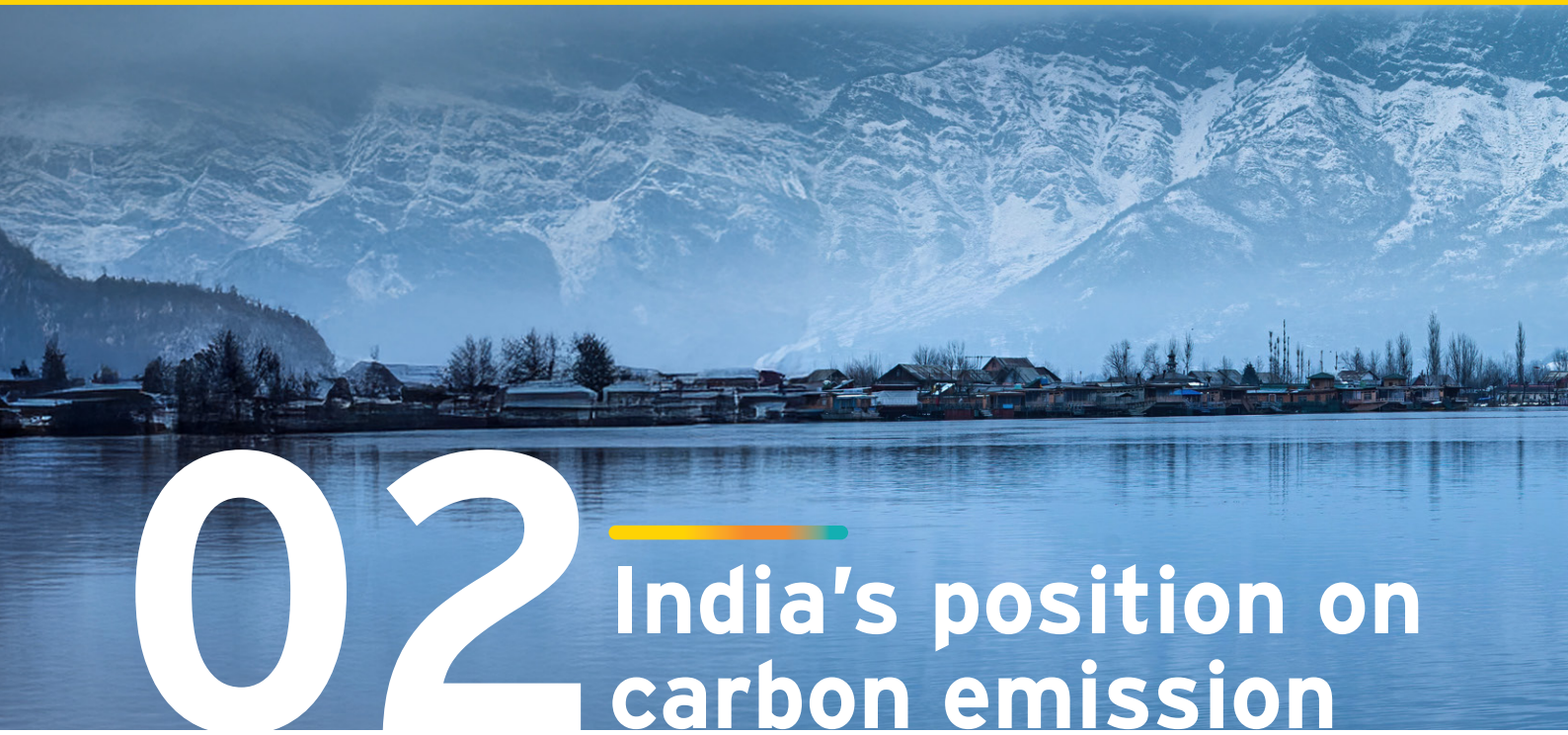
*Include industrial process emissions
Figures as per IEA: Global Energy Review 2025



In response, global regulatory reforms have intensified, aiming to reduce emissions not only domestically but also across international supply chains. Regions such as the EU, UK, China and several G20 economies have expanded carbon-pricing systems, tightened industrial emissions norms, introduced mandatory reporting and accelerated renewable energy deployment. The EU has been at the forefront of these reforms — strengthening the EU Emissions Trading System (ETS), phasing down free allowances and embedding climate objectives into trade, energy and industrial policy. These measures reflect a broader global shift from voluntary decarbonization to mandatory, market-linked carbon accountability.

The global emissions challenge is concentrated in hard-to-abate industrial sectors that the IEA identifies as major contributors to energy-related and process-related emissions due to coal use, calcination and electricity-intensive production. These same sectors form a significant part of global manufacturing and international value chains, with substantial export flows to large consumer markets such as the European Union. India, China, Brazil, Turkey and other emerging economies have become key suppliers of these materials.

This intersection of high emissions and cross-border trade has prompted the European Union to introduce the Carbon Border Adjustment Mechanism (CBAM) — a regulatory instrument designed to establish that imported carbon-intensive goods face a carbon price comparable to that borne by EU producers. CBAM links trade access to verified emissions performance, applying EU-ETS-indexed carbon costs to imports of steel, aluminum, cement, fertilizers, electricity and hydrogen. By doing so, CBAM seeks to prevent carbon leakage, incentivize cleaner production globally and use the purchasing power of EU markets to influence upstream industrial emissions.



02 India's position on carbon emission

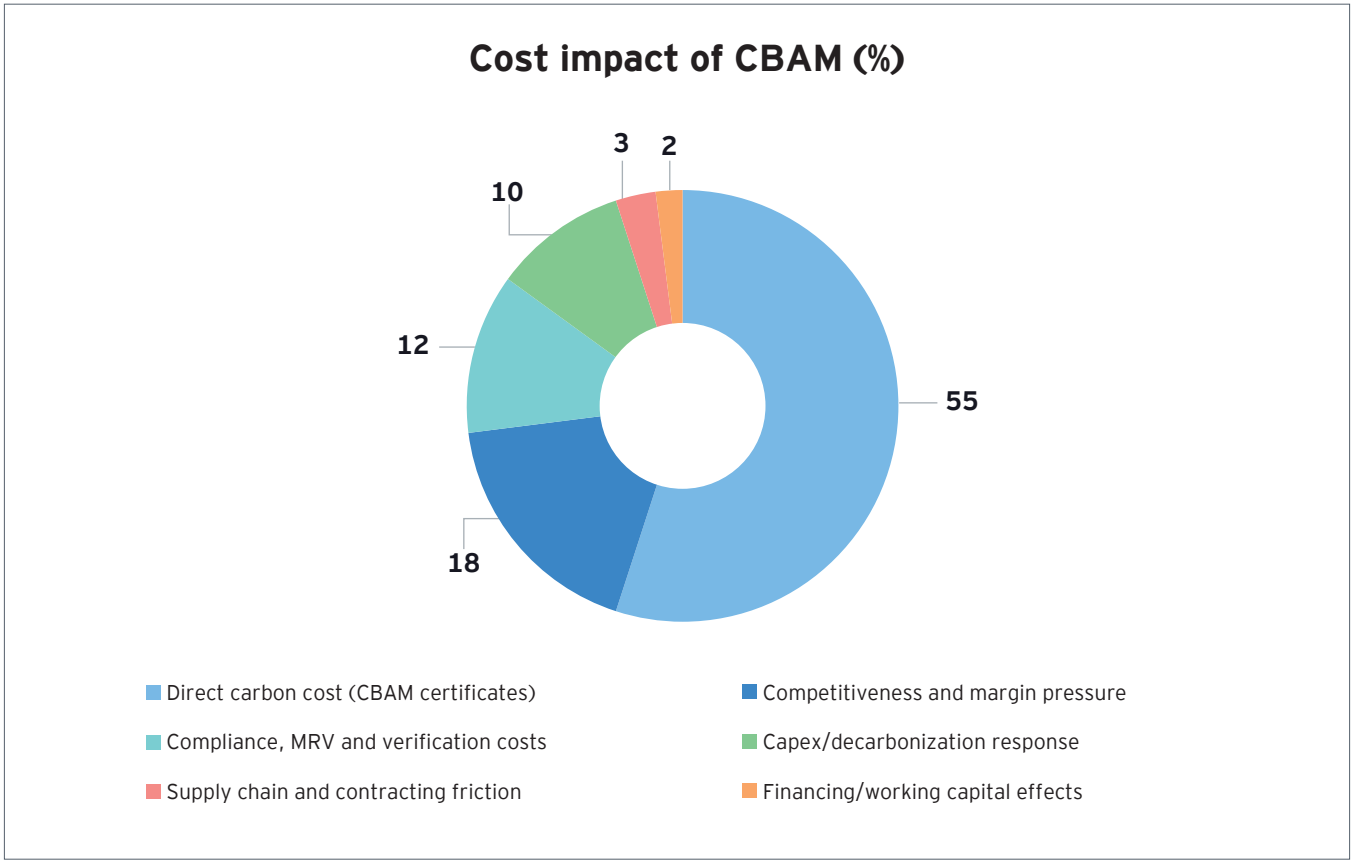
India today occupies a pivotal position in the global carbon economy, shaped by rapid economic expansion, rising energy demand and continued dependence on coal across industry, power generation and hard-to-abate sectors. Even as the country advances toward becoming a major manufacturing and service hub, it should navigate the complexities of balancing growth aspirations with climate responsibilities in an increasingly carbon conscious global market.

India has committed to a long-term low-carbon transformation. At COP26, India announced its net-zero target for 2070 and unveiled the Panchamrit commitments, which include major goals such as expanding non-fossil electricity capacity, reducing emissions intensity and increasing the share of renewables in the national energy mix. These commitments signal India's intent to align growth with sustainability, even as its energy demand and industrial output continue to rise.[3]

Within this broader transition, sectoral emissions profiles and export dependencies shape India's exposure to emerging climate-linked trade rules. India's most carbon-intensive industrial sectors are also deeply integrated into global value chains, with significant export linkages to markets such as the European Union. As global regulations increasingly tie market access to verified carbon performance, instruments like the EU's CBAM place new expectations on Indian businesses to improve emissions transparency, accelerate cleaner production technologies and strengthen monitoring and reporting systems.

India emerges as a particularly exposed economy due to the scale of its exports to the EU, the high carbon intensity of its steel and aluminum sectors, and the absence — until recently — of a mature domestic carbon price. In 2023, India was among the most exposed countries globally, with CBAM-covered exports to the EU exceeding €6 billion, dominated by iron and steel followed by aluminum. The country's continued reliance on coal-based steelmaking technologies amplifies its vulnerability amid rising global overcapacity and accelerating decarbonization pressures. In anticipation, India has initiated the development of a national Carbon Credit Trading Scheme (CCTS) and is exploring the introduction of an export-point carbon tax to offset CBAM liabilities and retain revenues domestically. However, concerns persist regarding administrative complexity, disproportionate impacts on small and medium enterprises and perceived tensions with the principle of common but differentiated responsibilities under the Paris Agreement — issues India has raised in multilateral trade forums.[4]

Overall, CBAM represents a structural shift in the governance of global trade, progressively linking market access to verified emissions performance. In the short term, its effects are characterized by administrative burdens, potential market fragmentation and heightened trade tensions. In the longer term, CBAM is likely to accelerate the global spread of carbon pricing, reorient trade flows and stimulate investment in low-carbon industrial technologies. For India and other emerging economies, CBAM thus constitutes both a competitiveness challenge and an opportunity for industrial modernization — one that will require coordinated climate diplomacy, targeted technology transfer and enhanced financial support to facilitate an equitable transition.



The pie chart represents an indicative breakdown of how CBAM-related costs are expected to distribute across key impact channels. Values are illustrative and represent proportional cost burdens.

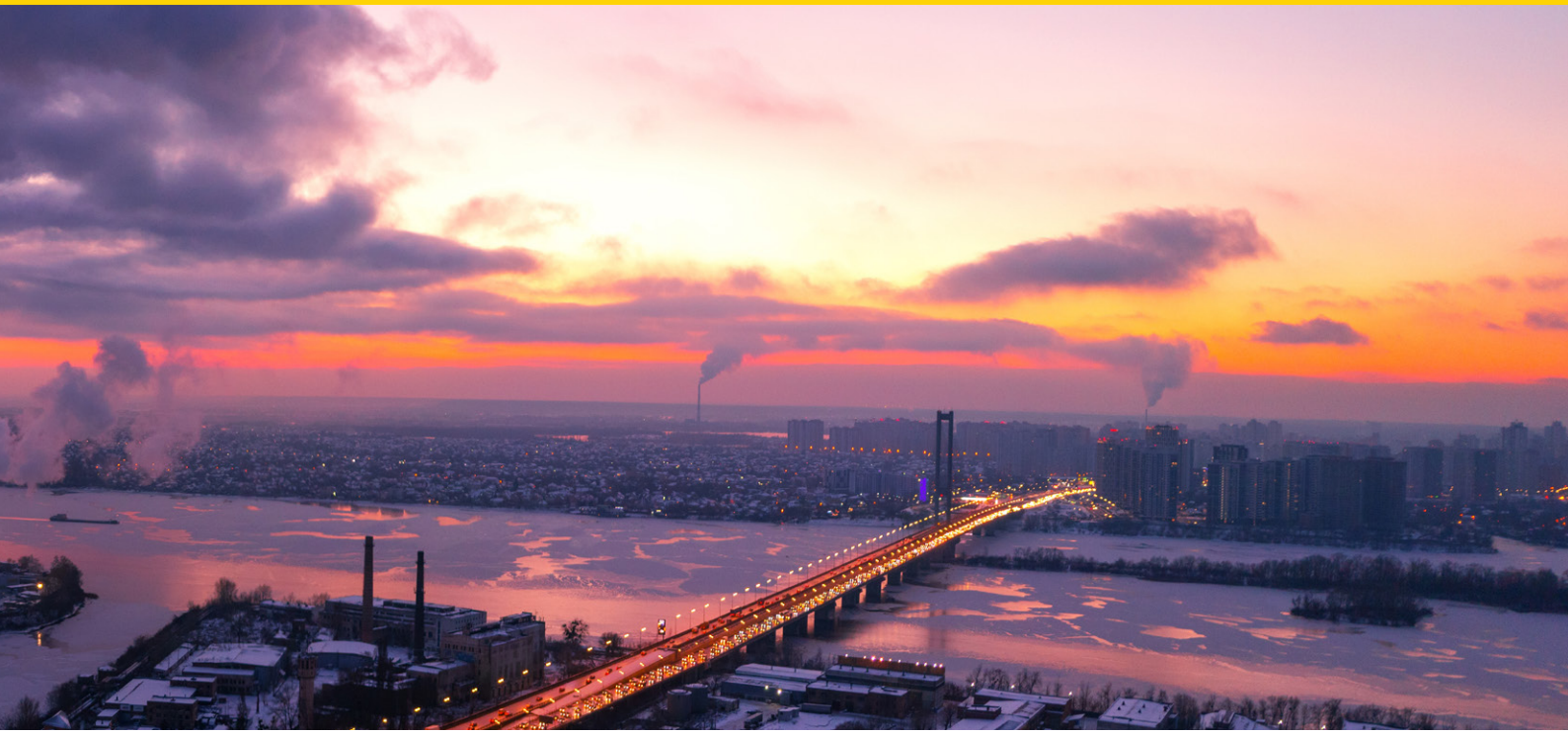
03 CBAM and its impact

The Carbon Border Adjustment Mechanism (CBAM) constitutes a central pillar of the European Union's (EU) climate strategy under the European Green Deal, aimed at achieving climate neutrality by 2050. It was conceived to address the persistent risk of carbon leakage, whereby carbon-intensive industries relocate production to jurisdictions with weaker climate regulations, thereby undermining the environmental integrity of the EU's decarbonization efforts. While the EU has long operated the Emissions Trading System (EU ETS) – a cap-and-trade mechanism that limits total emissions and requires companies to buy allowances for every ton of CO emitted – rising carbon prices and tightening emissions caps increasingly exposed domestic producers in sectors such as steel, cement, aluminum and fertilizers to competitive disadvantages.

To mitigate this imbalance, the European Commission proposed CBAM in 2021, seeking to extend EU-style carbon pricing to selected imports by imposing a charge equivalent to that faced by EU producers under the ETS. Following its formal adoption in May 2023, CBAM entered a transitional phase on 1 October 2023, during which importers are required to report embedded emissions without making financial payments. The mechanism's definitive phase, which commenced on 1 January 2026, requires importers of iron and steel, aluminum, cement, fertilizers, hydrogen and electricity to purchase CBAM certificates priced in line with EU ETS allowances. Over time, the scope is expected to expand to additional sectors and downstream products.

Empirical evidence from the transitional phase suggests that CBAM has not yet produced measurable changes in trade flows, as exporters have largely absorbed reporting-related administrative costs. However, the introduction of financial obligations from 2026 is expected to trigger structural adjustments in global production and trade. Macroeconomic modeling indicates that while the overall impact on the EU economy will be modest – projected GDP contraction of around 0.22% by 2030 – the sectoral effects are pronounced. Imports of CBAM-covered goods are expected to decline significantly, particularly in emissions-intensive sectors, alongside a marked reduction in carbon leakage within the EU. These gains, however, are accompanied by distributional consequences for trade collaborators with high emissions intensity and strong reliance on the EU market.

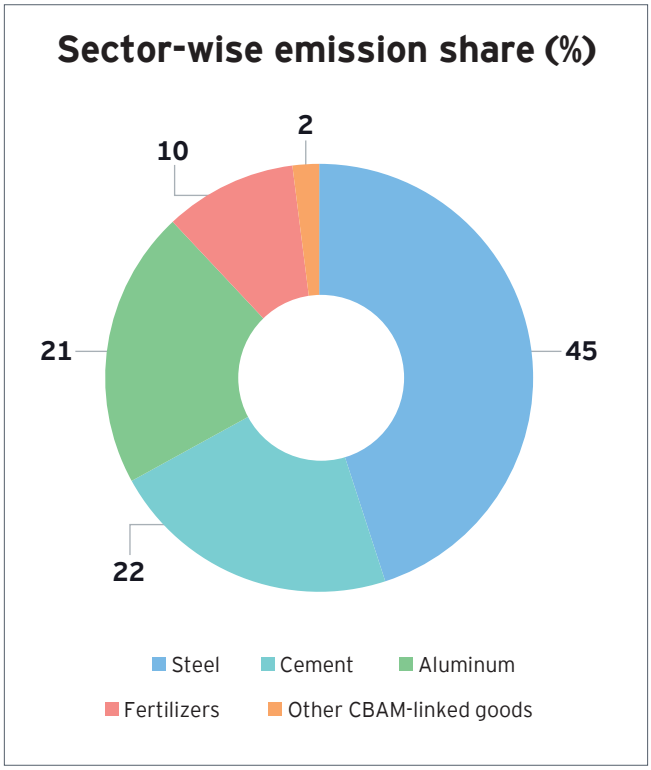
Globally, CBAM exposure is highest for large exporters such as China, Türkiye, India, Brazil, Vietnam and Ukraine, as well as for several lower-income economies where CBAM-covered goods constitute a substantial share of industrial output. In response, a growing number of countries, including China, Türkiye, Brazil, the United Kingdom and India, have begun adopting or expanding domestic carbon pricing mechanisms to reduce CBAM liabilities and retain carbon-pricing revenues domestically. These developments point to significant policy spillovers, with CBAM already catalyzing the diffusion of carbon markets worldwide. Nonetheless, the adjustment burden remains uneven: developed economies possess greater fiscal and technological capacity to subsidize decarbonization, whereas many developing countries face potential real-income losses in the absence of adequate financial and technological support.



Sectoral impact of CBAM in India

The EU Carbon Border Adjustment Mechanism (CBAM) represents a structural shift in global trade governance by embedding carbon costs directly into market access conditions. For Indian industries, CBAM primarily affects carbon-intensive, trade-exposed sectors — most notably steel, aluminum, cement and fertilizers — through mandatory emissions disclosure, certificate purchases aligned with EU ETS prices and stringent verification requirements. This transforms carbon from a background compliance consideration into an explicit cost component of exports, with implications for price competitiveness, margins and contractual arrangements.

Beyond direct cost pass-through, CBAM generates systemic adjustment pressures by incentivizing production-side decarbonization, emissions transparency across supply chains and alignment with emerging domestic carbon pricing instruments such as India's CCTS. The magnitude and distribution of impacts vary by sector, reflecting differences in emissions intensity, production technology, export dependence on the EU market and readiness to adopt low-carbon alternatives. The following sectoral deep dives examine these dynamics in detail for steel, aluminum and cement.



The pie chart presents the indicative distribution of embedded emissions across CBAM covered sectors, showing the largest contributors to India's embedded carbon footprint in export-oriented manufacturing. Values are illustrative.

1. Iron and steel

The steel sector is the most exposed, accounting for approximately 90% of India's CBAM-covered exports to the EU. Even before CBAM charges begin, steel exports to the EU have already fallen by 35.1%, dropping to US$3.05 billion in FY25 from FY24 levels, primarily due to reporting burdens and buyer-side price pressure. Several studies show further contraction once full carbon costs apply, reducing both EU-bound exports and competitiveness in non-EU markets.

Steel firms are shifting toward electric arc furnaces (EAF) and gas-based direct reduced iron (DRI), improving energy efficiency and preparing plant-level MRV systems to avoid default values.[5] [6]

2. Cement

Cement exports to the EU are modest in volume but are expected to decline sharply under CBAM due to extremely high process emissions. Studies show that cement experiences one of the steepest proportional export declines, with limited diversion options due to product bulkiness and freight costs.

Major producers are lowering clinker ratios, increasing alternative fuels and piloting waste-heat recovery and Carbon Capture, Utilization, and Storage (CCUS).[5]

3. Aluminum

India's aluminum exports to the EU have already declined by 9.8% in FY25 in response to CBAM's reporting requirements and buyer-side renegotiations. Aluminum faces moderate reductions under CBAM, largely driven by coal-based captive power that inflates indirect emissions. Non-EU market competitiveness may weaken further as carbon-linked costs pass through supply chains.

Leading aluminum producers are transitioning to renewable-linked smelting, virtual power purchase agreements (VPPAs) and scrap-based secondary aluminum.[6]

4. Fertilizers

Fertilizers display a more resilient and mixed response. Initial studies show exports to the EU may rise in the early stages due to relatively lower carbon intensity and small baseline volumes but fall later as CBAM obligations tighten across the economy. Overall, fertilizers are the least negatively affected sector among CBAM-covered industries.

Firms are improving energy efficiency, adopting green ammonia pilots and strengthening emissions data systems.[5]

5. Energy and electricity (indirect effects)

CBAM's cost pressures extend indirectly into India's energy system. Electricity-intensive production faces higher carbon-linked costs, causing declines in fossil-fuel-based output while strengthening relative demand for renewables, which may expand under CBAM.

Utilities are scaling renewable capacity, modernizing grids and preparing to integrate the domestic CCTS with Renewable Energy Certificates (RECs).[5]

6. Downstream manufacturing and households

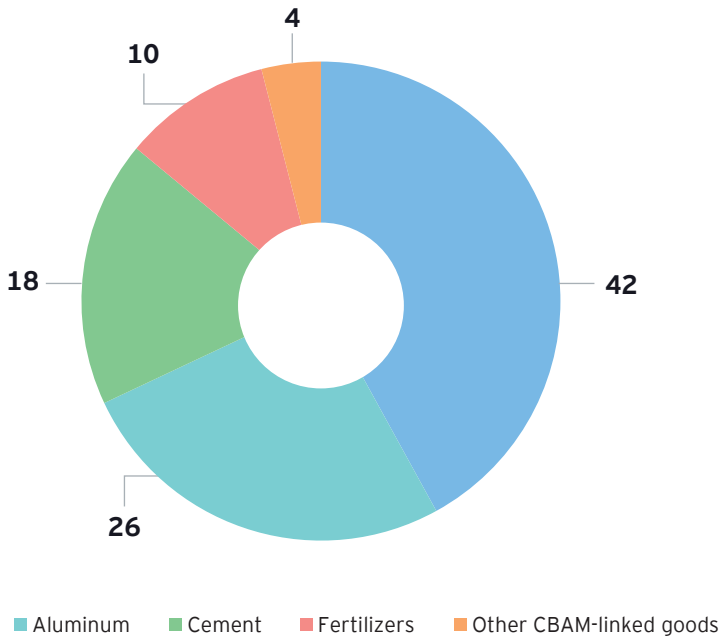
CBAM-driven increases in steel, cement and aluminum costs raise input prices for construction, automotive and capital goods sectors. This reduces domestic output and productivity and leads to measurable household welfare losses — especially in urban areas tied to manufacturing-sector income.

Firms are redesigning value chains, improving materials efficiency and exploring low-carbon procurement to mitigate input cost escalation.

Most impacted sectors and industrial consequences[5] [6]

Sector	Nature of impact	Expected market shift (2026–2030)
Iron and steel	**Critical/high risk.** Responsible for ~30% of industrial emissions. Face 15%-22% price hikes on EU exports due to CBAM.	Shift from coal-based blast furnaces to **Green Hydrogen-DRI** and electric arc furnaces (EAF). Consolidation as smaller players struggle with MRV costs.
Cement	**High opportunity.** Indian cement is already among the world's most energy-efficient.	Major players are becoming **net sellers** of carbon credits, creating a new revenue stream that offsets green technology costs.
Aluminum	**Moderate/high.** High reliance on coal-fired captive power plants.	Accelerated transition to **renewable energy (RE) bundling** and power purchase agreements (PPAs) to lower the carbon footprint per ton.
Power and utilities	**Systemic.** Integration of CCTS with RECs.	Rapid phase-out of inefficient "sub-critical" coal plants. Utilities will trade credits based on their grid-emission factors.

Cost impact on each sector (%)



The pie chart reflects how CBAM-driven costs are expected to fall unevenly across sectors, highlighting greater impacts on energy- and carbon-intensive industries.

04 CBAM's impact on India's metal and mining sector

India's metals and mining sector sits at the core of the country's industrial ecosystem, supplying essential inputs for construction, infrastructure, transportation, energy and manufacturing. The sector is characterized by energy-intensive production routes — most notably coal-based steelmaking and electricity-driven aluminum smelting — which give rise to high embedded emissions. As global trade becomes increasingly shaped by climate-aligned regulations, these characteristics place India's metallurgical industries under growing scrutiny, particularly in export-oriented value chains.

Under CBAM, iron and steel and aluminum are among the first metal categories brought fully under the reporting and pricing framework. Both are considered carbon-intensive, trade-exposed goods due to their high process and electricity-related emissions, as well as their long-standing export linkages with the European market. This brings these sectors directly within CBAM's scope, requiring verified installation-level emissions data and imposing EU-ETS-indexed carbon costs on export shipments. For producers reliant on coal-based power or legacy blast furnace–basic oxygen furnace (BF-BOF) routes, CBAM materially increases the cost of EU-bound trade and elevates the need for transparent MRV systems.

India's current goods exports to the EU are about US$63.5–US$75.8 billion annually, with iron and steel (US$4.25 billion) and aluminum (US$0.92 billion) forming the core CBAM exposed segments. Given this exposure, several billion dollars' worth of Indian exports now face CBAM linked carbon costs, with steel and aluminum bearing the highest immediate financial impact due to their embedded emissions.[7]

At the same time, CBAM's evolving design suggests that more metal forms and downstream products may be included in future expansions. The mechanism is explicitly structured to broaden its coverage as the EU phases out free allowances and strengthens its domestic ETS. This creates the possibility that semi-finished and finished metallurgical products — such as stainless steel forms, specialty alloys, fabricated metal components and copper or nickel-based goods — could gradually come under CBAM obligations as methodologies mature and product-level emissions accounting becomes more standardized. For India, this forward-looking risk means that metal producers beyond steel and aluminum will increasingly need to develop credible emissions data systems, reduce process intensity and build compatibility with international carbon-accounting norms.

The first annual CBAM declaration for 2026 imports — along with the surrender of corresponding certificates — is due on 30 September 2027, marking the beginning of full financial compliance under the definitive regime.

Iron and steel

India's iron and steel sector is amongst the most significantly exposed to the EU CBAM due to its reliance on coal-based BF–BOF production routes and its substantial export presence in the EU market. As CBAM shifts from a reporting requirement to a binding financial obligation starting January 2026, embedded carbon emissions become a chargeable attribute of steel exports, creating a structural disadvantage for Indian producers relative to low-carbon global benchmarks based on scrap-EAF or gas-DRI technologies.

The CBAM levy on steel imports is expected to range between US$55–US$65 per ton initially, with projections indicating an increase to nearly US$145 per ton by 2034 as free allowances under the EU ETS are phased out. Steel's classification as a "complex good" further extends CBAM's reach beyond pricing, mandating audited, installation-level emissions data (carbon tags) at the invoice level. Together, these requirements introduce material cost pressures, margin compression and compliance risks.[8]

In addition to these pressures, the iron and steel sector must contend with the extra reporting complexity created by CBAM's approach to precursor materials. A large share of embedded emissions comes from these upstream inputs, and in many cases, the reported emission intensity values for precursors exceed CBAM default values, creating difficulties for exporters. Because steel producers use multiple precursors across production stages, even small quantities of high-intensity inputs can significantly raise the final product's embedded emissions. This amplification effect highlights a key methodological challenge in the current CBAM framework — one that directly shapes both the financial burden and the competitiveness of Indian exporters as CBAM becomes a monetary obligation.

Studies indicate that CBAM could compress profit margins by 9% to 22%, forcing exporters to offer price reductions of around 15% to 22% to stay competitive — putting nearly 15% to 40% of India's steel exports to the EU at immediate risk of becoming commercially unviable.[8]

While short-term responses include diverting exports to non-CBAM markets in Africa, Latin America and West Asia, such strategies provide only temporary insulation. Sustained competitiveness under CBAM will depend on structural decarbonization, particularly a gradual shift away from BF–BOF routes toward gas-based DRI, scrap-based EAFs and hybrid configurations aligned with emerging low-carbon hydrogen availability. Leading Indian steelmakers have already begun this transition: firms are expanding renewable energy procurement, piloting hydrogen-DRI modules, increasing scrap utilization through new EAF capacities, deploying waste-heat recovery and adopting advanced energy-efficiency technologies. Parallel upgrades in MRV systems — including digital emissions tracking, third-party verification pipelines and plant-level carbon accounting — are becoming standard to avoid the application of conservative EU default values that could significantly inflate CBAM liabilities.

India's newly launched **Carbon Credit Trading Scheme (CCTS)** is expected to reinforce these efforts by establishing a domestic carbon price signal, incentivizing low-carbon production and enabling exporters to deduct any carbon costs paid within India from future CBAM obligations. In this sense, CBAM acts as a dual inflection point for India's steel sector: a near-term trade and profitability shock and a medium-to-long-term catalyst for technological upgrading and emissions governance reform.

CBAM related impacts and strategic implications for India's steel sector[5] [8] [9]

Risk	CBAM induced impact	Consequence for steel producers	Priority action
Carbon cost exposure	Levy of US$55–US$65/t, rising toward US$145/t by 2034	Higher landed costs; loss of EU price competitiveness	Reduce emissions intensity through process efficiency and fuel switching
BF–BOF production lock in	Structurally higher embedded emissions	Persistent disadvantage versus low carbon peers	Transition toward gas DRI, scrap EAF and hybrid routes
Margin compression	9%–22% decline in profit margins	Pressure on export oriented product lines	Product mix optimization and selective EU market participation
Market access risk	15%–40% of EU exports face viability challenges	Potential contraction of EU bound volumes	Short term market diversification alongside strategic EU retention
Compliance and MRV burden	Installation level audited "carbon tags" required	Higher compliance costs; penalty/ default value risk	Invest in MRV systems and third party verification
Supply chain data gaps	Incomplete upstream emissions data	Inflated reported emissions and CBAM liability	Supplier engagement and emissions data integration

Aluminum sector

India's aluminum sector is characterized by highly electricity-intensive smelting, a production base still dominated by coal-powered captive plants and increasing demand for low-carbon, high-quality aluminum in global value chains. Large integrated producers are progressively shifting towards renewable-linked power through captive solar and wind installations and virtual PPAs, yet sector-wide emissions remain elevated due to legacy coal dependence and uneven decarbonization among secondary and smaller manufacturers.

CBAM converts these structural gaps into direct border costs. Initial compliance cost estimates for primary aluminum range from US$50–US$140 per ton, translating into margin compression and buyer-driven price adjustments of 15% to 22%. The sector's exposure is compounded by its classification under CBAM's definitive regime, which mandates installation-level emissions data and third-party verification by EU-accredited or ISO 14065–compliant verifiers from 2026 onward. Where firm-specific data are unavailable, EU default values apply — often overstating actual emissions and inflating certificate liabilities, particularly for smaller and secondary aluminum producers with fragmented data systems.[10]

Trade exposure further amplifies risk. Approximately 22% to 27% of India's combined aluminum and steel exports (approximately US$8.2 billion in 2022) are EU-bound and shipment volumes have already softened during the transitional reporting phase, indicating compliance frictions even before financial settlement begins. While short-term market diversification towards Africa and West Asia offers partial relief, long-term competitiveness hinges on structural measures: accelerated access to clean electricity, scaling secondary aluminum and high-quality scrap systems and building robust, verification-ready MRV systems. In this sense, CBAM functions not only as a cost shock but as a systemic compliance and governance inflection point for India's aluminum value chain.[11]

To address these pressures, aluminum producers are undertaking a series of decarbonization and compliance-readiness measures. Leading firms are expanding captive solar and wind capacity, entering virtual power purchase agreements and accelerating shifts toward scrap-based secondary aluminum, which offers significantly lower emissions intensity. Investments in digital MRV systems, product-level emissions accounting and third-party verification are being scaled to avoid the use of EU default factors. Additionally, India's emerging CCTS is expected to support the sector's transition by introducing a domestic carbon price signal and enabling partial deduction of carbon costs paid in India from future CBAM obligations. Together, these developments position the sector for a more credible, low-carbon export profile in an increasingly carbon-regulated global market.

CBAM related impacts and strategic implications for India's aluminum sector[10] [11]

Risk	CBAM induced impact	Consequence for aluminum producers	Priority action
Carbon cost exposure	US$50–US$140/t CBAM liability linked to EU ETS prices	Margin compression; buyer driven price renegotiations	Embed carbon pass through clauses; prioritize low carbon production routes
Coal based power dependence	High indirect emissions from electricity intensive smelting	Structural disadvantage vs. renewable based producers	Scale group captive renewables, VPPAs, storage and load shifting
Data and default value risk	EU default emissions applied where plant level data are missing	Inflated declared emissions and certificate needs	Invest in installation level MRV, digital product passports and supplier data sharing
Verification and compliance burden	Mandatory third party verification from 2026	Higher compliance costs; risk of audit bottlenecks	Build verification ready governance, controls and auditor pipelines
Revenue and market access risk	22%–27% of exports EU bound; volumes already softening	Potential erosion of EU market share and price realization	Short term market diversification alongside EU focused decarbonization
Technology transition gap	Legacy assets limit rapid emissions reduction	Slower adjustment relative to global low carbon benchmarks	Phase capex toward RE linked smelting and future hydrogen compatibility
Secondary aluminum constraints	Recycling cuts emissions ~95%, but scrap systems are weak	Under utilization of low carbon aluminum potential	Scale segregated scrap collection, quality standards and circular supply chains

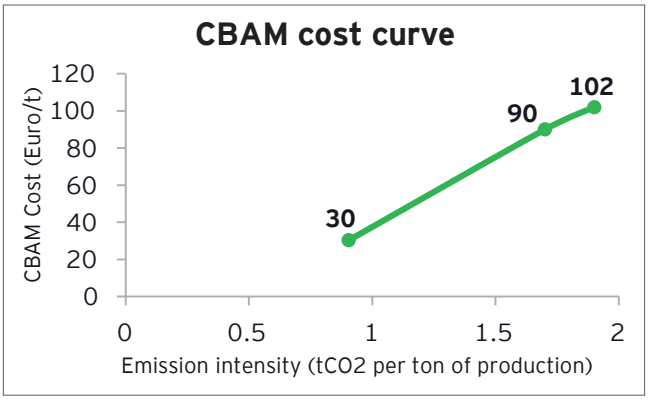
Insights from on-ground engagements by EY regarding CBAM readiness in India

During our client engagements with leading metal and mining industries for CBAM implementation, we encountered various challenges faced by these industries. Initial process-level cost simulations projected a CBAM liability in the range of approximately €200–€250 per ton of exported product, prior to accounting for free allocation adjustments. Upon incorporating the Specific Embedded Free Allocation (SEFA) mechanism, the cost estimates were recalibrated to reflect the effective emissions subject to CBAM obligations. SEFA refers to the free emission allowances that EU producers receive under the EU-ETS for specific products being exported to the European Union. The revised CBAM cost per ton was computed using the following formulation:

CBAM cost per ton = [(actual emissions - SEFA) - ((carbon price paid * actual emissions)/price per CBAM certificate)] * price per CBAM certificate

The application of this adjusted methodology resulted in a substantially lower estimated CBAM liability – approximately €100 per ton. This reduction highlights the material impact of SEFA in moderating the effective carbon cost exposure of exporters. It further underscores the importance of methodological clarity, transparent calculation frameworks and sector-specific guidance to enable consistent, equitable and technically robust CBAM compliance across the metal and mining sector.

The CBAM cost curve demonstrates a clear and positive correlation between emission intensity and the resulting CBAM liability across the assessed production stages. Production processes with higher emissions intensity (tCO per ton of output), particularly downstream operations such as cold rolling, incur disproportionately higher CBAM costs due to the cumulative effect of upstream and direct process emissions embedded in the final product. The curve further illustrates that even marginal increases in emission intensity can materially amplify CBAM exposure. This finding reinforces the strategic importance of targeted decarbonization interventions in emission-intensive stages of the value chain to mitigate carbon cost risks and enhance long-term export competitiveness under the CBAM framework.



05 India's strategic response to CBAM

CCTS-anchored carbon pricing, revenue retention and competitiveness (2026–2030)

As of January 2026, India has entered a phase where carbon policy is no longer anticipatory but operational and trade-relevant. Domestic regulation (via the Carbon Credit Trading Scheme, CCTS), external trade conditionality (via the EU's Carbon Border Adjustment Mechanism, CBAM) and international carbon-market architecture (via Article 6) are converging to reshape industrial strategy, finance and supply-chain governance. The key question is no longer whether Indian firms will face carbon constraints, but where the carbon price is paid, who retains the revenue and how adjustment costs are managed.

The empirical results from different studies indicate that CBAM's adverse effects on India are driven less by large, economy-wide output losses and more by three channels:

01 Trade competitiveness pressures in EU-bound value chains.

02 Distributional effects on households (notably through price and income linkages).

03 Fiscal leakage, i.e., carbon-pricing revenues accruing outside India, which limits domestic capacity to cushion adjustment.

This framing changes the policy logic: the most structurally appropriate response is not short-term relief or sector-specific subsidies alone, but a domestically governed carbon pricing mechanism that (a) internalizes carbon costs within India, (b) retains revenues domestically, and (c) uses those revenues to manage competitiveness and welfare impacts.

The CCTS, notified in 2024 and under phased implementation, is designed as a compliance-based carbon market for emissions-intensive sectors (iron and steel, cement, aluminum, fertilizers, electricity). This sectoral overlap with CBAM is strategically critical: the study finds India's CBAM exposure is concentrated precisely in these sectors through EU export contraction, higher production costs and downstream price effects.

By embedding carbon pricing at the point of production – within the same sectors that CBAM targets – CCTS allows India to shift the locus of carbon cost internalization from a foreign border adjustment to a domestic, rules-based system. In strategic terms, this converts CBAM from a unilateral external constraint into a domestically managed price signal aligned with industrial transition planning.[12]

CBAM's most economically consequential effect for India is carbon-revenue outflow to the EU, which weakens domestic demand, amplifies household welfare losses and reduces fiscal space for transition support. A CCTS-anchored domestic carbon price directly reverses this mechanism: carbon revenues – particularly from auctioning carbon credits – remain within India's fiscal system.

Strategic revenue recycling becomes the fulcrum of mitigation:

- Household compensation to neutralize welfare losses (especially where cost pass-through affects consumption baskets).
- Time-bound transition support for emissions-intensive firms (to prevent abrupt competitiveness shocks and disorderly adjustment).
- Capital deepening in clean technologies (energy efficiency, electrification, fuel switching, process innovation), strengthening long-run productivity and resilience.

In other words, CCTS turns carbon pricing from an externally imposed payment into a domestic fiscal tool — one capable of funding the very adjustments CBAM compels.

CCTS provides a practical mechanism for targeted redistribution — using carbon revenues to offset regressive effects and protect vulnerable groups — thereby reframing carbon pricing as socially managed transition policy rather than a pure compliance burden.

From a trade-strategy perspective, a domestic carbon price anchored in a transparent, compliance-oriented market strengthens India's position vis-à-vis CBAM's logic of recognizing an "effectively paid" carbon price. While EU recognition remains discretionary, a credible domestic system improves India's ability to argue for equivalence and may reduce effective CBAM liabilities — moderating the export contraction identified in the study.[13]

Crucially, this is not achieved through ad-hoc rebates or episodic fiscal interventions, but through institutional credibility, robust MRV and predictable regulatory design — features that also help Indian exporters meet CBAM's data and verification requirements.

CBAM affects only EU-bound goods. The study also points to broader structural shifts — reduced fossil-fuel-based activity and increased renewable-linked activity — as CBAM reshapes incentives. A domestic carbon price via CCTS amplifies and generalizes these signals across the domestic market within covered sectors, accelerating:

Fuel switching (coal renewables/ gas where relevant/ green hydrogen).	**Energy efficiency and process optimization.**	**Technological upgrading at scale** (rather than only for export lines).

This alignment establishes that India's response is not simply a narrow trade-compliance exercise, but a strategic initiative for long-term industrial transformation strategy.[5]

Embedding domestic carbon pricing in CCTS preserves policy sovereignty: India retains control over price discovery, thresholds, benchmarks, timelines and — most importantly — revenue allocation. This enables climate action to be calibrated to national development priorities and distributional realities while also responding credibly to international climate-trade regimes. Strategically, it allows India to engage CBAM and Article 6 on more equal terms, rather than being positioned as a passive rule-taker.

06 CBAM: An opportunity for revenue growth

Although the EU Carbon Border Adjustment Mechanism (CBAM) is primarily framed as a trade restrictive climate instrument, its effects across India's metals and mining sectors — steel, aluminum and cement — also create pathways for revenue growth through strategic reorientation. Across all three sectors, CBAM exposes legacy export patterns characterized by high dependence on the EU market, limited price pass through capacity and insufficient differentiation on carbon performance. By monetizing embedded emissions at the border, CBAM alters relative price signals and incentivizes Indian producers to reassess destination markets, product mix and carbon intensity as determinants of revenue realization rather than compliance costs alone.

In steel, empirical export data indicate that diversification away from concentrated EU destinations toward selected markets in Africa, Latin America and West Asia can yield higher unit revenues even before accounting for avoided CBAM certificate costs. Average realized export prices for flat rolled steel products in several non EU markets exceeded EU prices during FY 2022–23, implying that CBAM induced diversification can function as a revenue enhancing strategy rather than a defensive response. Similar dynamics are emerging in aluminum, where renewable linked smelting, secondary aluminum and verified low carbon production enable access to sustainability sensitive demand segments with superior price realization. Cement, while smaller in absolute EU export volumes, faces acute margin sensitivity; here, CBAM strengthens the business case for prioritizing blended cements, low clinker products and selective market participation to preserve revenue per ton rather than volumes alone.

Across sectors, the common revenue lever lies in carbon differentiation. CBAM effectively rewards producers that can demonstrate lower embedded emissions through verified data, enabling either price premiums, sustained EU market access, or redeployment of volumes to markets with stronger near term demand growth and fewer carbon border constraints. Complementary macro factors — including demand growth in emerging economies, moderation in competing supply (notably China in steel) and favorable currency movements — further reinforce the revenue upside from rebalancing export portfolios. In this sense, CBAM accelerates a shift from volume led export growth toward value and carbon intensity adjusted revenue strategies across India's metals and mining sectors.[8]

CBAM does not merely redistribute compliance costs; it reshapes revenue architecture. Firms that integrate export diversification, low carbon production pathways and credible MRV systems are better positioned to convert CBAM pressure into higher unit revenues, improved margin resilience and access to premium market segments. For India's steel, aluminum and cement industries alike, revenue growth under CBAM conditions is increasingly tied to strategic repositioning rather than market withdrawal.

Conclusion

This paper demonstrates that the EU's Carbon Border Adjustment Mechanism (CBAM) represents a fundamental reconfiguration of how climate policy, trade and industrial competitiveness interact. For India, CBAM's principal challenge lies not in economy-wide output losses, which remain modest, but in sector-specific competitiveness pressures, distributional impacts and the risk of carbon-pricing revenues accruing outside the domestic economy. These effects are most pronounced in emissions-intensive metals and mining sectors that combine high carbon intensity with strong EU export exposure.

However, the analysis also shows that CBAM is not unambiguously punitive. When viewed through a revenue and structural-adjustment lens, CBAM accelerates shifts that are already economically and environmentally desirable: export diversification, cleaner production technologies, circular material flows and transparent emissions governance. Firms and sectors that can credibly demonstrate lower embedded emissions are increasingly positioned to secure price premiums, maintain access to sustainability-sensitive markets and improve long-term margin stability.

India's emerging CCTS provides a strategic instrument to manage this transition on domestic terms. By shifting carbon cost internalization from the EU border to the point of production, CCTS enables revenue retention, targeted redistribution and planned industrial upgrading. More importantly, it preserves policy sovereignty over carbon pricing design while strengthening India's negotiating position in climate-trade forums. Ultimately, CBAM should be understood not as a temporary trade shock, but as an enduring feature of the global low-carbon transition — one that requires coordinated industrial policy, credible MRV systems and deliberate revenue recycling to enable competitiveness, equity and sustainability.

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Head office Branch offices
Head Office ICC Towers, 4 India Exchange Place, Kolkata-700001
Contact: 033-22534200, Fax 033-22534303, Email: ceo@indianchamber.net

Delhi
Northern Regional Office 807, Kailash Building, 26 Kasturba Gandhi Marg New Delhi – 110001 Contact No: 011-46101431, 011-46101432, 011-41550734, 011-46101435, 011-46101436, 011-46101437, 011-46101440 Email: debmalya.banerjee@indianchamber.net

Mumbai
Western Regional Office Kanakia Zillion, H Wing, Unit No.535, LBS Marg, Kurla (W), Mumbai 400 070
Contact: 022-6127 7443, 022-35141001, +91-7304458711
Email: ratheesh.nair@indianchamber.net

Chennai
Tamil Nadu State Office 3rd Floor 92, East Coast Chambers, GN Chetty Rd, T. Nagar, 600017, Contact: UDAYAKUMAR. P
Email: udayakumar.p@indianchamber.net
Mobile: +91 8946011681

Rajasthan
Rajasthan State Office, Jaipur Branch, Sumit Sehrawat, Jayshree Periwal International School, Senior Block, Mahapura Rd, Narayan-Y-Block, Mahapura, Bhankrota, Rajasthan - 302026,
Contact: SUMIT SEHRAWAT, Mobile: +91- 8467077007,
Email: sumit.sehrawat@indianchamber.net

Hyderabad
Telangana State Office TSR Towers,6-3-1090,"B"-Block Ground Floor, Raj Bhavan Road Telangana – 500 082
Contact: +91-40-48570787

Guwahati
North East Regional Office Kushan Plaza, 1st Floor, Above Hyundai Showroom, Opp. Ganeshguri Petrol Pump Near Hanuman Mandir, Guwahati – 781006 Contact:- 0361 - 2232716/2232767
Email: ishantor.sobhapandit@indianchamber.net

Agartala
Agartala Office Department of Industry and Commerce Khejur Bagan Kunjaban 6, Near Ginger Hotel Agartala, Tripura (West)
Contact: +91-8860128904 Email: sujit.das@indianchamber.net

Ranchi
Jharkhand State Office Indian Chamber of Commerce 181 C, Road No. 4 Ashok Nagar Ranchi – 834002, Jharkhand.
Contact: SANTOSH KUMAR, Mobile: +91 9576922877
Email: santosh.kumar@indianchamber.net

Patna
Patna State Office-1st Floor, Indira Bhawan, RCS Path, Bailey Rd, Patna, Bihar - 800001, Contact: Mr. Avinash Roy,
Mobile: +91 9576922877
Email:- avinash.roy@indianchamber.net

Bhubaneswar
Odisha State Office BDA-HIG 23 Opposite of Pal Heights (Behind Aditya Birla Building) Jaydev Vihar, Bhubaneswar - 751 013, Odisha. Contact: 0674-2303326/28/29, 0674-2303327 (Telefax), Email: jyotiprakash.pal@indianchamber.net

Siliguri
Siliguri Office, "Radha Apartments", 2nd Floor ISKCON Mandir Road, Siliguri - 734001, Contact: BIVEK SASHANKAR,
Mobile: +91-7029222485,
Email: bivek.sashankar@indianchamber.net

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Our offices

Ahmedabad
22nd Floor, B Wing, Privilon
Ambli BRT Road, Behind Iskcon Temple
Off SG Highway, Ahmedabad - 380 059
Tel: + 91 79 6608 3800

Gandhinagar
8th Floor, Building No. 14A
Block 14, Zone 1
Brigade International Financial Centre
GIFT City SEZ
Gandhinagar – 382 355, Gujarat
Tel: + 91 79 6608 3800

Bengaluru
12th & 13th Floor
"UB City", Canberra Block
No.24 Vittal Mallya Road
Bengaluru - 560 001
Tel: + 91 80 6727 5000

Ground & 1st Floor
11, 'A' wing
Divyasree Chambers
Langford Town
Bengaluru - 560 025
Tel: + 91 80 6727 5000

3rd & 4th Floor
MARKSQUARE
#61, St. Mark's Road
Shantala Nagar
Bengaluru - 560 001
Tel: + 91 80 6727 5000

1st & 8th Floor, Tower A
Prestige Shantiniketan
Mahadevapura Post
Whitefield, Bengaluru - 560 048
Tel: + 91 80 6727 5000

Ecospace
1st Floor, Campus 1C
Ecospace Business Park
Outer Ring Road, Bellandur - Sarjapura
Area, Varthur Hobli,
Bengaluru Urban – 560103

Bhubaneswar
8th Floor, O-Hub, Tower A
Chandaka SEZ, Bhubaneswar
Odisha – 751024
Tel: + 91 674 274 4490

Chandigarh
Elante offices, Unit No. B-613 & 614
6th Floor, Plot No- 178-178A
Industrial & Business Park, Phase-I
Chandigarh - 160 002
Tel: + 91 172 6717800

Chennai
6th & 7th Floor, A Block,
Tidel Park, No.4, Rajiv Gandhi Salai
Taramani, Chennai - 600 113
Tel: + 91 44 6654 8100

Delhi NCR
Aikyam
Ground Floor
67, Institutional Area
Sector 44, Gurugram - 122 003
Haryana
Tel: + 91 124 443 4000

3rd & 6th Floor, Worldmark-1
IGI Airport Hospitality District
Aerocity, New Delhi - 110 037
Tel: + 91 11 4731 8000

4th & 5th Floor, Plot No 2B
Tower 2, Sector 126
Gautam Budh Nagar, U.P.
Noida - 201 304
Tel: + 91 120 671 7000

Hyderabad
THE SKYVIEW 10
18th Floor, "SOUTH LOBBY"
Survey No 83/1, Raidurgam
Hyderabad - 500 032
Tel: + 91 40 6736 2000

THE SKYVIEW 20
2nd Floor, 201 & 202
Right Wing, Survey No 83/1
Raidurgam, Hyderabad - 500 032
Tel: + 91 40 6736 2000

Jaipur
9th Floor, Jewel of India
Horizon Tower, JLN Marg
Opp Jaipur Stock Exchange
Jaipur, Rajasthan - 302018

Kochi
9th Floor, ABAD Nucleus
NH-49, Maradu PO
Kochi - 682 304
Tel: + 91 484 433 4000

Kolkata
22 Camac Street
3rd Floor, Block 'C'
Kolkata - 700 016
Tel: + 91 33 6615 3400

6th floor, Sector V, Building Omega
Bengal Intelligent Park, Salt Lake
Electronics Complex, Bidhan Nagar
Kolkata - 700 091
Tel: + 91 33 6615 3400

Mumbai
14th Floor, The Ruby
29 Senapati Bapat Marg
Dadar (W), Mumbai - 400 028
Tel: + 91 22 6192 0000

5th Floor, Block B-2
Nirlon Knowledge Park
Off. Western Express Highway
Goregaon (E)
Mumbai - 400 063
Tel: + 91 22 6192 0000

3rd Floor, Unit No.301
Building No.1, Mindspace-Gigaplex
IT Park, MIDC, Plot No. IT-5
Airoli Knowledge Park
Airoli West, Navi Mumbai - 400 708
Tel: + 91 22 6192 0003

18th Floor, Altimus
Pandurang Budhkar Marg, Worli
Mumbai - 400 018
Tel: + 91 22 6192 0503

Pune
C-401, 4th Floor
Panchshil Tech Park, Yerwada
(Near Don Bosco School)
Pune - 411 006
Tel: + 91 20 4912 6000

10th Floor, Smartworks
M-Agile, Pan Card Club Road
Baner, Pune - 411 045
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