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Implications of global climate regulations on Indian MSMEs

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The views expressed in this work are those of the authors and do not necessarily reflect the views of TERI or FCDO

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1.0 Introduction

Climate change is regarded as one of the most serious global challenges and hence countries around the world are taking steps to curb carbon emissions. The United Nations Framework Convention on Climate Change (UNFCCC) aims to strengthen international commitments and collaboration toward a net-zero future. The Paris Agreement[1], signed at UN Climate Change Conference (COP21) in 2015 was a landmark in the multilateral climate change process and led to a globally shared long-term temperature goal of keeping the increase in world average temperature to less than 2 ◦C above pre-industrial levels. For the first time, to combat climate change, every country set out goals to reduce their overall carbon footprint. Under the agreement European Union (EU) pledged to become carbon neutral by 2050. India, being a developing country, declared that it would become carbon neutral by 2070.

To meet the net zero targets, the carbon emissions reduction trajectories in the short-, medium-, and long-term would be important. For example, in the short term, EU plans to reduce emissions by at least 55% by 2030 from 1990 levels and India has pledged to reduce the energy intensity of its GDP by 45% by 2030 from 2005 levels. Both EU and India have started formulating new regulations for key sectors and individual industries. EU have established strict guidelines with respect to individual industries that they need to adhere to a certain limit of carbon emissions and has established the EU Emission Trading Scheme (EU-ETS) in 2005[2]. India has its own cap-and-trade system, called Perform, Achieve, and Trade (PAT) aimed at energy efficiency improvement of large industries and is planning to migrate to a domestic carbon market by 2026.

In addition, some developed countries are formulating tools to put a fair price on the carbon emitted during the production of carbon intensive goods imported into their countries. The rationale behind the movement is mainly to ensure that 'carbon price of imports is equivalent to the carbon price of domestic production' so that manufacturers do not simply shift the production of carbon-intensive goods from developed to other emerging economies with less stringent CO_2 emissions policies. The Carbon Border Adjustment Mechanism (CBAM) regulation of the European Union (EU) was formulated to address carbon leakage by imposing a carbon tax on goods imported into the EU market, based on the emission footprint of these goods.

Being a new regulation, there are uncertainties regarding the impact of global climate regulations on exported goods from India, especially since bulk of these goods are manufactured in the Micro, Small and Medium Enterprises (MSME) sector. This paper provides an overview of emerging climate regulations like EU-CBAM and examines the key barriers being faced by Indian industry, especially engineering MSMEs, to comply with the

[1] https://unfccc.int/process-and-meetings/the-paris-agreement
[2] https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/development-eu-ets-2005-2020_en

emerging climate regulations. Recommendations for MSMEs to comply with global climate regulations while reducing risk are provided. The recommendations are aimed at policymakers, both in India and the EU. The paper is based on secondary literature review as well as inputs drawn from interactions/ interviews of selected export-oriented MSMEs, industry associations and trade bodies.

2.0 Carbon tax – rationale, sectors covered and implementation phases

The two most used market-based mechanisms for decarbonisation based on regulation are the carbon tax and border adjustment of carbon tax. Carbon tax which sets a tax on carbon emissions is often recommended as a tool for controlling greenhouse gas emissions and nudging enterprises towards low carbon development. It is argued that decarbonisation is best achieved through a carbon tax that offers a transparent fiscal tool of addressing the environmental damage caused by greenhouse gases. Although it is likely to have a mixed results for GDP, depending on the structural constraints of the economy, it is supported on the ground that it forces the adoption of low carbon technology.

In the field of international cooperation aimed at addressing climate change, a carbon tax levied at the borders is often advocated as an effective solution to prevent carbon leakage between trading partners and achieve optimal results for global emission reduction. EU, which has rolled out a package of instruments called “Fit for 55” program to achieve climate neutrality by 2050, has established the Emission Trading Scheme (ETS), which levies a price on CO_2 and other greenhouse gas emissions. An ETS places a limit on the amount of greenhouse gas emissions – it allows emitters with lower emissions to sell their extra emissions units (or ‘allowances’) to higher emitters, thereby establishing a market price for emissions.

The carbon price at the ETS, however, is currently only valid for companies located in the EU. Imported products thereby achieve a cost advantage over products produced within the scope of the EU-ETS. This leads to competitive pressure on EU-ETS companies and increases the risk that these companies will move supply or even production outside the scope of the EU-ETS, a phenomenon known as “carbon leakage” (Ehrenstein & Neiland, 2021).

EU has announced its intention to introduce the border adjustment of carbon tax for its trading partners from 2026. One of the cornerstones of the program, which is within the large “Fit for 55” package imposed a carbon tax on goods imported into the EU market based on the emission footprint of these goods. The tax is imposed if the emission footprint of imported goods is higher than similar goods being produced within the EU. The rationale is to ensure that the goods imported are subject to the same carbon cost as those produced within the EU under EU’s ETS. Thus, foreign producers need to pay a tax for the carbon emissions embedded in their products, levelling the playing field between EU industries and global competitors.

The first sectors to have been targeted by this tax include six high-energy intensive sectors like iron & steel, cement, aluminum, fertilizer, hydrogen and electricity. The list would be progressively enlarged. The taxation rates can be as high as 25-30%. The initial sectors were selected based on their contribution to carbon emissions in EU. And even in these sectors, not all products are covered at present. Only few selected products from each of these sectors are included in EU-CBAM. However, new products are likely to be added to the lis.

There are two phases of EU-CBAM - transitional period and definitive period. The transitional phase started in October 2023 and will run until December 2025. There are no strict reporting or regulatory obligations during this transitional phase. The objective of the period is to serve as a pilot and learning periods for all stakeholders (importers, producers and authorities) and to collect useful information on embedded emissions to refine the methodology for the definitive period which will commence from 1st January 2026. Thus, the transitional phase provides enough time for the methodology of reporting embedded carbon to become fair, transparent and robust. In the definitive phase there is a regulatory obligation which requires exporters to report their product footprint in line with the methodology which is provided. Along with that, there is audit and verification by third party. Exporters will need to submit the requirement to the importer as asked by them from time to time.

From 1st January 2026, the EU importers of goods covered by EU-CBAM will need to register with national authorities where they can also buy CBAM certificates. The price of the certificates will be calculated depending on the weekly average auction price of EU-ETS allowances expressed in €/tonne of CO_2 emitted. EU importers will declare the emissions embedded in their imports and surrender the corresponding number of certificates each year. If importers can prove that a carbon price has already been paid during the production of the imported goods, the corresponding amount can be deducted.

The price signal would incentivise exporters to the EU to make their production process as well as their supply chain less carbon intensive. Decarbonisation of industry on a global scale would get greater momentum. Other major economies would face calls from environmental activists to emulate the CBAM.

3.0 Potential impact for Indian exporters

The EU is India's largest trading partner, accounting for about 12% of total Indian trade in goods. India's exports to the EU was valued at $ 98.9 billion in FY 24. Key exports include textiles, machinery, chemicals, metals and automotive components (Best, Frank (2023). India's steel exports to Europe hit a five-year high in FY24 with outbound shipments hovering at 3.3 million tonnes (mt). Italy, Belgium, and Spain are among the major European markets for Indian steel exports. The value of steel exports was about $ 6.64 billion (6.7% of total exports).

The implications of implementation of the border adjustment of carbon tax on Indian MSMEs and global supply chain needs to be monitored. The findings of independent studies on imposition of EU-CBAM are mixed, while a study by Goldar et al. (2023) indicates that EU-CBAM will adversely impact India's trade with the EU, majorly affecting India's iron and steel exports. This, in turn, may result in reduced demand for Indian goods, negatively impacting India's export-oriented industries (Best, Frank (2023). On the other hand, a study by Majumder et al. (2023) shows that the impact of EU-CBAM on Indian exports will be negligible. This could be well the case since Indian heavy industries like steel and aluminium has been making commendable progress in becoming more energy efficient and less carbon intensive after the introduction of PAT scheme by Bureau of Energy Efficiency (BEE) in 2012.

Against this backdrop, it is difficult to provide a clear conclusion on the expected impact of the EU-CBAM on Indian exports. As more information becomes available, further analysis will be necessary, working closely with the industry to better understand the impact on real-world plans.

4.0 Barriers to complying with the carbon border adjustment taxes

In 2023-24, the Ministry of Micro, Small and Medium Enterprises (MSME), Government of India data shows that 15.25% of MSME exports went to the EU, highlighting the EU's importance as a market for Indian MSMEs. To equip Indian steel industry stakeholders with insights into global methodologies for emission monitoring and India's evolving carbon credit trading mechanisms two workshops were organised by TERI in at Chennai (November 2024) and Raipur (February 2025) under the project 'Knowledge sharing on emission monitoring methodologies for the Indian Steel Sector' supported by the Foreign, Commonwealth & Development Office (FCDO), Government of UK.

The deliberations at the workshop also provided an insight into the barriers being faced by export-oriented engineering units in India, especially MSMEs, to complying with evolving global climate regulations. The major barriers identified during the interactions can be summarised as:

1.1 Information barrier
2.1 Barriers to emission monitoring
3.1 Barriers to estimating embedded emissions
4.1 Financial barriers

These barriers are discussed in more detail below.

4.1 Information barrier

It was found that there is very low awareness about global climate regulations such as the upcoming border adjustment of carbon tax among export-oriented engineering MSMEs. This could be attributed to the fact that a number of them do not export their products directly

but rather rely on agents/ intermediaries who interact with the European buyer. Also, it is possible that since EU-CBAM is still in transitional period the buyer is not insisting on the carbon footprint of the product. There is little knowledge of the emission monitoring methodologies and reporting requirements under new regulations such as EU-CBAM even among MSMEs who are exporting their goods directly to EU. Due to limited knowledge and in-house capacity to calculate and report carbon footprint per tonne of the product, sellers, especially those in the MSME sector, are likely to seek the help of external consultants to prepare the necessary EU-CBAM reports in the future.

4.2 Barriers to emission monitoring

Under EU-CBAM, any seller from non-EU country needs to calculate the carbon footprint of the goods by a methodology provided by EU and provide the report to the buyer in EU. The following methodologies are recommended to be used for estimating the emissions under EU-CBAM.

a) Calculation based methodology – This is based on actual monitoring of the required parameters and subsequent calculation of the carbon footprint using certain formulas.

b) Monitoring based methodology – This requires installation of continuous emission monitoring systems in stacks/chimneys. However, this method may be quite challenging in terms of capital investments needed for hardware and operational cost of maintaining the monitoring systems.

c) Hybrid of calculation and monitoring based methodologies – This is a mix of calculation and monitoring based methodologies.

Companies can use the calculation-based methodology using established international standards such as ISO 14067 (carbon footprint of products) for reporting embedded emissions under CBAM in the transitional phase which would end on 31st December 2025. A combination of specific emission data, industry-specific methodologies, or national reporting frameworks can be used to monitor emissions under the calculation-based methodology can be based on site. Third-party verification is not mandatory during the transitional phase.

From January 2026, the default CBAM methodology, aligned with the EU ETS Monitoring and Reporting Regulation (MRR), will become mandatory. Importers must follow a standardized approach for emission calculations using monitoring-based methodology or a hybrid of calculation and monitoring based methodologies. Third-party verification by accredited auditors will also be required. Importers will need to purchase CBAM certificates corresponding to their reported embedded emissions.

The CCTS, which is being introduced by the Ministry of Power in India, excludes MSMES and covers about 1400 designated (large) industries across 13 sectors, including steel and aluminum. Based on baseline studies which are being conducted by accredited energy auditors, each designated industry will receive an individual carbon intensity target. Carbon emissions will be tracked and industries that reduce emissions beyond their targets earn

Carbon Credit Certificates (CCCs), while those falling short must purchase CCCs to meet compliance. The CBAM methodologies are different from the methodologies specified under the up-coming carbon credit trading scheme (CCTS) in India and international World Steel Association (WSA) methodology for calculating green-house gas (GHG) emissions. It was found that export-oriented MSMEs have poor knowledge of the different recommended GHG monitoring methodologies. Because of poor knowledge and differences in calculation methodologies, most industries prefer to engage external consultants for emission calculations.

4.3 Barriers to estimating embedded emissions

The EU-CBAM concept has been developed in line with the emissions covered by the EU-ETS and estimates the emissions as if the imported goods were produced in the EU. The EU-ETS and EU-CBAM requires direct and indirect emissions of the production process as well as the embedded emissions of precursors to be considered, a concept similar to carbon foot printing of the goods. The EU-ETS requires operators to pay a price for their own ("direct") emissions. However, if they consume electricity, they also experience the CO_2 costs included in the price of electricity they purchase ("indirect emissions"). Similar criterion would apply to any good that is exported to EU.

EU-CBAM defines two type of goods – simple goods and complex goods. A simple good does not have a precursor while complex goods have precursors. The majority of the products manufactured and exported by MSMEs fall in the category of complex goods. For example, if bought-out steel sheet or rod is used, the route to manufacture the steel e.g. blast furnace-basic oxygen furnace (BF-BOF), direct reduced iron (DRI)-electric furnace and so on should be known. The direct and indirect emissions in the manufacture of steel should be accounted for. Further, the embedded emissions from raw materials and intermediate inputs like dolomite, pig iron, DRI, ferro-alloys and need to be considered which may not be available with the raw material suppliers.

Most MSMEs buy raw materials like steel and aluminium from primary producers and undertake value-added manufacturing operations like casting, forging, rolling, machining and so on before selling the product. These raw material precursors therefore contribute to the "embedded CO_2 emissions". Estimating the embedded emissions for complex goods which use raw material like steel often produced by many different routes (BF-BOF, DRI-EAF electric furnace) is challenging. There is substantial variation in the specific emissions (tCO_2/t of steel) among the different production routes. Moreover, due to batch-wise variation in the specific emissions and sourcing of the raw materials from dealers/intermediaries, obtaining a certificate for the specific emissions of the raw material is a challenge. Although, EU-CBAM has established detailed guidelines and communication templates/tools to estimate the embedded emissions of goods, proper accounting of the indirect and embedded emissions of the manufactured goods pose a challenge since emission certification system for domestic raw materials supplies are yet to be normalised.

4.4 Financial barriers

EU-CBAM's financial obligation factors in the difference between the weekly average EU-ETS carbon price and the carbon price paid in the exporting country (if any). Based on this difference, an importer can claim a corresponding deduction from the EU-CBAM obligation. This design element of EU-CBAM poses significant challenges, particularly concerning the carbon pricing disparities between the EU and non-EU countries. The EU carbon price was trading in the EUR 80 - EUR 100 per tonne range in 2023. In comparison, a carbon pricing system (in the form of a carbon tax or an ETS) is often non-existent in exporting economies, especially in developing economies like India. Alternatively, there are large differences related to decarbonisation potential in the countries that is not accounted for by the CO_2 price alone. Moreover, the high cost of borrowing capital and small scale of operations of MSMEs affect the cost-effective CO_2 reduction opportunities in India, making direct comparison of CO_2 price a challenge. Large differences between EU and non-EU carbon prices could imply a smaller deduction from EU-CBAM's financial obligation and thus impact the carbon competitiveness of exporting countries.

> *"Compliance comes at a cost"*
> - MSME entrepreneur

There are substantial financial costs associated with emission monitoring and reporting. EU-CBAM recommends that the reliance on secondary data should be minimized, and the emission calculations should be based on primary data as far as possible. For obtaining the primary data, the Indian entity needs to install monitoring systems at multiple locations like emission sources and fuel consumption centers involving additional capex.

Also, most MSMEs do not have the in-house technical competence to comprehend the detailed EU-CBAM guidelines and fill the emission communication templates. Hence they need to engage the services of external consultants at a cost. Being a relatively new regulation, there are very few credible consultants conversant with the CBAM methodologies and calculation tools. Engaging credible consultancy firms who are capable of providing these services and additional inhouse manpower to liaise with the consultants puts an additional financial burden on the sellers to EU. This is perceived to have an effect on their price competitiveness, especially MSMEs, as the quantum of goods exports exported by them is relatively small to absorb the additional costs which have to be incurred by them.

5.0 Recommendations

The analysis of the literature on global climate regulations and stakeholder interviews has highlighted a number of issues which need to be addressed to facilitate compliance, especially among MSME sector units. The recommendations can be summarized around four broad heads, namely:

1. Simplification of monitoring methodologies
2. Capacity building

3. Technical assistance
4. Policy and regulatory measures

These recommendations are targeted at key stakeholders (policymakers, developmental institutions and academics) in both Europe and India. The stakeholders need to work together to address the barriers so that MSMEs could create a competitive advantage, e.g., those who implement carbon mitigation technologies, or already have low emissions intensities, could actually benefit from being able to outcompete other more emissions-intensive exporters to the EU.

5.1 Simplifying monitoring methodologies

> We attach documents received from a customer regarding the requirements for complying with the CBAM legislation for your study and awareness. Let me know if this is an area where TERI could guide the manufacturing sector.
>
> - Request received from MSME entrepreneur to TERI

The present data collection template of EU-CBAM is very elaborate and difficult for MSMEs to navigate on their own without proper guidance. Detailed information needs to be provided for each direct and indirect emission sources, measurement approaches in each production process, embedded emissions of precursors and so on. Most primary metal (steel and aluminum) producers do not provide emission certificates with their products to end-users, making it difficult for MSMEs to report emissions of precursors. Also, apart from primary metal, the MSME may be using other precursors like chemicals, sand and so on and that too from different suppliers. At present, no emission data are provided by the suppliers of these precursors to the industry. There is a need to simplify the emission monitoring methodologies especially for MSMEs in developing countries.

One option could be to develop simplified methodology which could use 'default' values in case actual values are not available for the emissions. The 'default' values might be on the high side to help encourage companies to use primary data instead. This may be better especially for smaller inputs that contribute only a small portion of total emissions. An initiative needs to be taken by both Government of India and EU together to gather and develop an emission data repository for key input materials for selected Indian sectors. A second option could be for policymakers in Europe and India to work together towards making the simplified EU-CBAM methodology interoperable and/or compliant with the proposed CCTS for large industries in India.

5.2 Capacity building

Large-scale industries in steel and aluminum sectors have already implemented a number of measures for reducing their energy consumption and carbon emissions under the PAT scheme. However, lack of access to affordable cleaner energy sources like natural gas and cleaner raw materials like scrap have limited accelerated decarbonization of some industries such as iron and steel. Steel industry, particularly those in small and medium-scale, are faced with the twin

challenge of taking measures to reduce their carbon footprint, while at the same time complying with the EU-CBAM regulations. CBAM relies on extensive data inputs and emissions tracing. Indian MSMEs lack training for these processes. These enterprises need to hire external consultants as well as build the capacity of workers and supervisors on new green technologies and practices in every production area. The additional compliance costs may make exports unattractive for small businesses, since their volume of exports is relatively small. Therefore, India should proactively build an ecosystem to enhance MSME capacities and develop supportive policy frameworks for CBAM monitoring, reporting and verification (MRV) challenges.

There is a need to support MSMEs to green their industries and build systems to reduce their footprint to avoid high import duties and fines. Although EU has committed to support developing countries in implementing the EU-CBAM and greening their supply chain, a lot more work needs to be done on the ground. The entrepreneurs and supervisors of MSME are generally not trained/skilled on emission monitoring and reporting. It is essential to help them in understanding how the emission monitoring tool works, and to provide them with the knowledge and skills needed to fill the communication templates efficiently. Capacity building programs for industry stakeholders, especially MSMEs, on the methodological aspects of measuring and reporting emissions as well as on new green technologies and practices which can be adopted by them will greatly facilitate compliance. EU may consider funding this initiative as a part of its commitment to support developing countries in implementing CBAM.

5.3 Technical assistance

From 2025, the EU will start the process of accrediting the accreditation bodies as well as the verifying agencies. In the transitional period, no verification is required. Hence many of the potential accreditation bodies/ and verifying agencies are presently engaged in providing advisory services to industry. While the large industries can afford to hire their advisory services, MSMEs need technical assistance, involving hand-holding support from experienced energy efficiency consultants and EU-CBAM experts, on adoption of clean energy technologies and recommended monitoring and reporting protocols for next few years. The key elements of technology assistance should include:

- One-on-one interactions**.** It is essential to facilitate interaction between technical agencies, accreditation bodies and MSME entrepreneurs on a regular basis to ensure that clarifications to specific queries on EU-CBAM are provided and investment decisions on adoption of clean technologies and monitoring protocols are facilitated.
- Establish and strengthen local service providers/consultants**.** A pool of local service providers on emission reporting needs to be developed at national/regional level and so that they can provide necessary technical assistance to MSMEs.
- Encourage transfer of low carbon technologies. Governments of both EU and India have a key role in leveraging international funding mechanisms to facilitate access to clean technologies and expertise especially for the MSME sector.

5.4 Policy and regulatory measures

> *"CBAM is a government-to-government issue"*
>
> - MSME entrepreneur

Global climate regulations like CBAM could be a major opportunity for India to create green competitive manufacturing capacity. The Government of India has an important role to develop policies and regulations to steer rapid green industrialization with specific supporting measures which could be evolved in consultation with industry. This could be in the form of an interest subsidy, capital grant or lower GST rates for industries which would be affected by border adjustment of carbon tax. At the same time, India needs to strengthen its domestic policies on emissions monitoring, reporting, and verification (MRV) systems and carbon pricing. Targeted support measures for industries such as subsidies, carbon contracts for difference, regulatory policies and so on by the Government of India would help build the business case for investing in decarbonisation in India. Changing the nomenclature of the coal cess to a 'carbon tax' should be considered to reduce industries' potential carbon liabilities (Gupta et al. 2024). To minimise the impact of international carbon taxes, it would build on insights from the emerging CCTS in India and other international standards like WSA for steel. A strong India Carbon Market (ICM) will accelerate decarbonisation of the industrial sector. The most important determinants of the impact of the carbon border adjustment taxes, will be the sectoral coverage established by the ICM and the level of carbon price, and how this differs from the international carbon taxes. Whilst setting a higher price under the CCTS would reduce costs of exporting to the industrialised countries, it could cause greater issues for the wider industry, if they are not ready to decarbonise their production.

6.0 Conclusion and next steps

Every country has a shared but differentiated responsibility to reduce carbon emissions. Although the historical contribution of India to global warming has been relatively small, its emissions are projected to increase rapidly as the country's economy grows. Despite the dramatic fall in costs, clean energy sources like green hydrogen are still not competitive against fossil fuels across all end-uses, particularly heavy-duty industry. As India develops its economy to meet the growing needs of its people, the country is faced with the challenge of mobilising investments for the transition to a low-carbon ecosystem. Studies have shown that there has been limited carbon leakage till date, as heavy industries in the EU are protected by free allowance and are yet to face the impact of climate policies (Beck et al, 2023, Climate Policy Info Hub). All measures to address carbon leakage are imperfect, including carbon border taxes.

Many global firms are wanting to bring their supply chains to India. The success in manufacturing which has been eluding India so far could be within reach over the next few years, if India moves swiftly with pragmatism and ambition to lower carbon emissions in collaboration with industrialised economics. Given the interdependencies and complexity of international trade, CBAM will help in lowering global emissions, but need collaboration across different types of economics to bear the additional cost and compliance. Further

analysis needs to be done on global climate regulations like CBAM and its impact on exports of specific goods produced by MSME sector. Such a study will require wider consultation with relevant stakeholders and examine the impact on trade in the context of specific sectors and goods. The consultations should specifically cover the impact on MSMEs as well as long-term technical as well as financial assistance needed to improve their competitiveness.

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