

## **CBAM ready trade: Assessing socio economic impacts of process choice for decarbonisation under the evolving global trade dynamics for India**

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The implementation of Carbon Border Adjustment Mechanism ( CBAM) by the European Union (EU) has significant implications for developing countries like India, which have important exports in the "harder to abate" sectors of iron and steel and cement. The EU's CBAM proposal aims to level the playing field for EU producers against imports from countries with less strict climate policies, by putting a carbon price on imported goods based on their embedded emissions.

To avoid paying the CBAM, Indian producers of iron and steel and cement would need to make their exports CBAM-ready, which means reducing the carbon intensity of their products. However, this is challenging as these sectors are highly energy-intensive and emissions from these sectors are mainly from the combustion of fossil fuels, which are deeply embedded in their production processes.

India has already committed to add 500 GW combined solar and wind capacity by 2030 however, an increasingly cleaner grid does not directly translate into product decarbonisation for these sectors. This research evaluates direct and indirect economic and environmental impacts of three alternative strategies for CBAM readiness under the background of ongoing energy transitions in India

1. Investments in technology switch towards low carbon manufacturing process in cement and Iron & Steel sector thereby minimising embodied emissions from manufacturing process. This involves creating a technology block for switch to i) electric arc furnaces for iron and steel sector ii) dynamic batch production for cement manufacturing for maximising variable renewable energy input in the sector . The data has been procured from Industry sources for the technology switch
2. Adjusting embodied emission from Iron & Steel and cement industry by trading through proposed National Carbon Market with trading EScerts (Energy saving certificates)
3. CBAM based tax adjustment with revenue recycle as international transfers for mitigation support in India, primarily modelled in terms of efforts for carbon sink creation

The cumulative impacts of these alternatives are evaluated using E3-India, an integrated macro econometric regional simulation model for India. The model couples accounting framework of the economy at subnational level with balances for energy and environmental emission. The model also provides a non-linear interaction (two-way feedback) between the economy, energy demand/supply, and environmental emissions. The short- and long-term behavioural changes are captured through econometric equations and the impacts is simulated till 2030. An array of economic indicators including change in sector output, employment and income effects for rural and urban households are evaluated for the three alternatives along with change in embodied carbon emissions for the three alternatives. Further direct and indirect impacts of decarbonisation in Iron & steel and cement sectors on emission profiles of key economic sectors by 2035 is also evaluated. The preliminary runs reveal that without specific sectoral interventions for decarbonisation in Iron & steel and cement industries the high renewable trajectory for India will elicit selective increase in carbon emission by over 2.5 million Tons by 2030 from these "harder to abate" sectors alone.

There is ongoing research and debate on the potential impacts of Carbon Border Adjustment

Mechanism (CBAM) on developing countries. Some argue that CBAM could lead to a significant reduction in emissions globally, benefiting all countries in the long run. Others warn that CBAM could exacerbate existing inequalities in the global economy, particularly if it is not implemented in a way that takes into account the different capacities and development trajectories of countries. This research provides an initial guidance on socio economic impacts of process choice for decarbonisation under the changing global dynamics of trade for developing countries like India thus creating a space to negotiate better on international platforms.