

Exposure of Developing Countries to EU Carbon Border Adjustment Mechanism (EU CBAM)

Maryla Maliszewska (World Bank)

Joint work with Carolyn Fischer, Euijin Jung (World Bank)
and Maksym Chepeliev (Purdue Uni)

Ninth IMF-WB-WTO Trade Conference

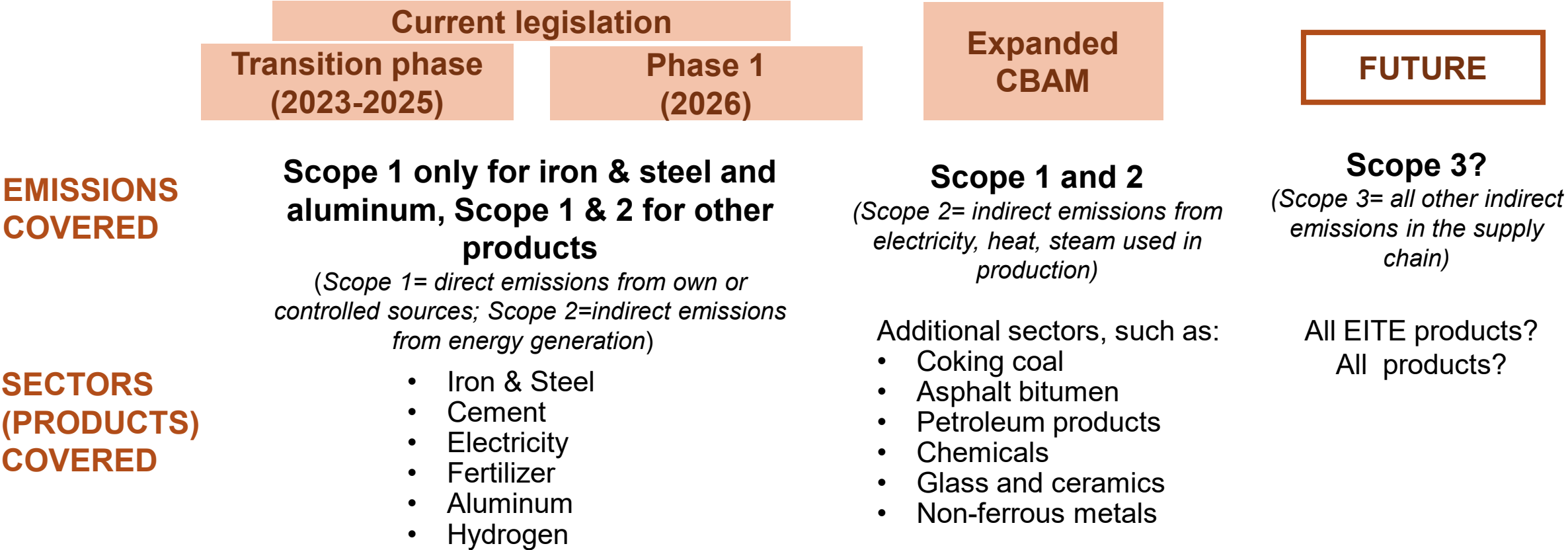
October 24-25, 2023



Overview

- CBAM Legislation
- CBAM Exposure Index: data, methodology, findings
- Policy recommendations for the World Bank and other IOs

EU CBAM: current legislation and possible development



Expanding CBAM increases protection against leakage but also increases complexity and reporting burden.

CBAM exposure index: methodology

- A simple index designed to **identify countries with a high exposure to CBAM**
- Provides an insight on countries' relative competitiveness on the EU market.
 - Recognizes that the reform removes free allocation and requires EU producers to pay for their embodied emissions in full

$$\text{CBAM exposure index} = X_{cs}^{EU} / X_{cs}^{World} * \$100 \text{ per ton} * EI_{cs}$$

$$\text{Relative CBAM exposure index} = X_{cs}^{EU} / X_{cs}^{World} * \$100 \text{ per ton} * (EI_{cs} - EI_{EUs})$$

where:

c = country, s = sector, X = exports, EI = emission intensity

CBAM exposure index: data

- **Trade data:**
 - Countries' exports to the EU and world in 2019 at HS 6-digit level.
 - Collected from the World Bank's World Integrated Trade Solution (WITS).
- **Emission intensity data:**
 - Carbon emissions intensity of exports (kgCO₂e /USD of exports) by sector collected from:
 - Chepeliev, M., and Corong, E. 2022. "Revisiting the environmental bias of trade policies based on an environmentally extended GTAP MRIO Data Base."
 - Chepeliev, M., Aguiar, A., Farole, T., Liverani, A., and van der Mensbrugghe, D. 2022. "EU Green Deal and Circular Economy Transition: Impacts and Interactions." Paper presented at the 25th Annual Conference on Global Economic Analysis (Virtual Conference).

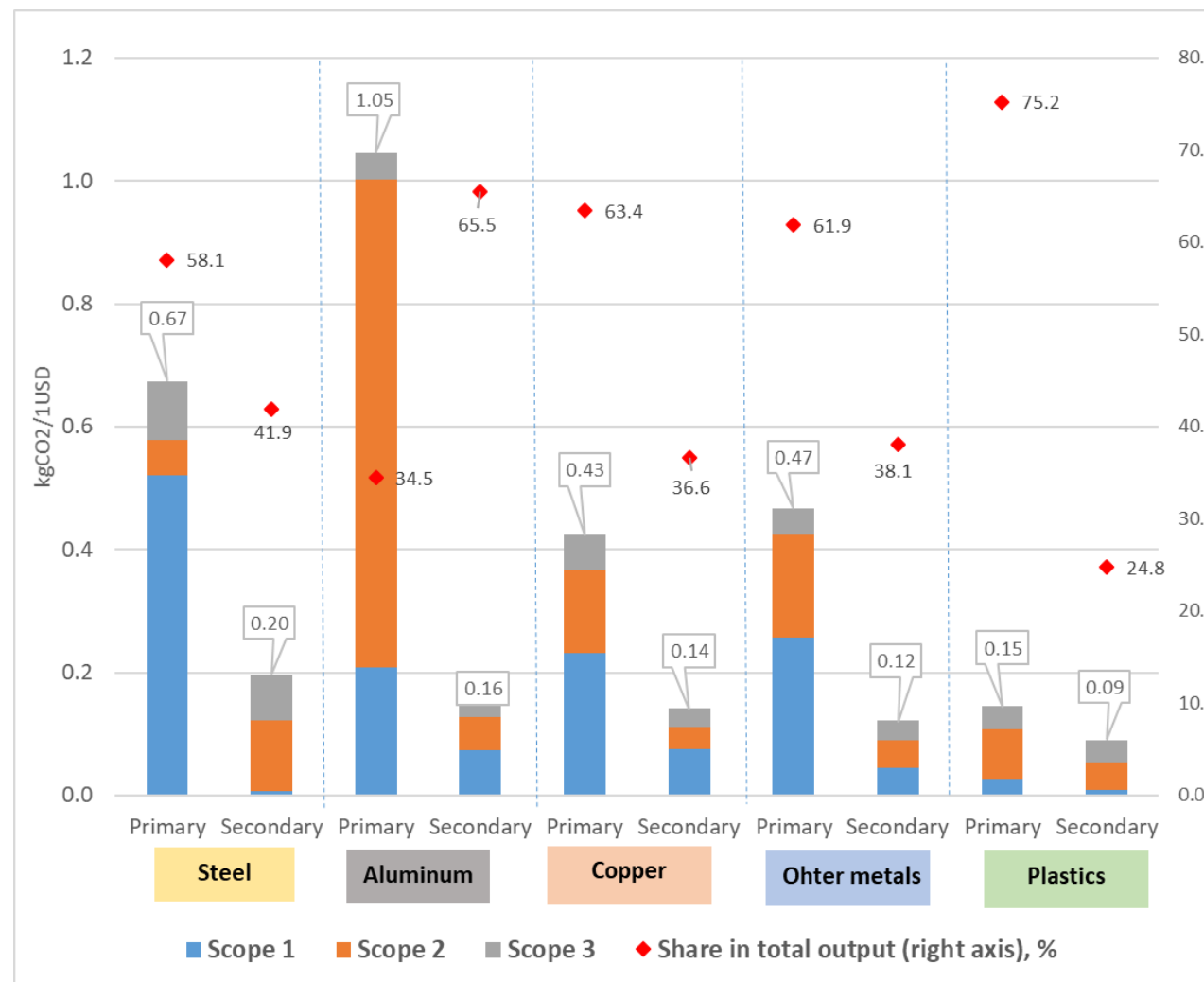
Caveat: The GTAP dataset provides aggregate sectors with a different composition of products, as well as underlying emission intensities. Variation in product composition can affect the index more than differences in emission intensity of production processes at the product level. (e.g., fertilizer in chemicals).

A new GTAP-CE database has been developed

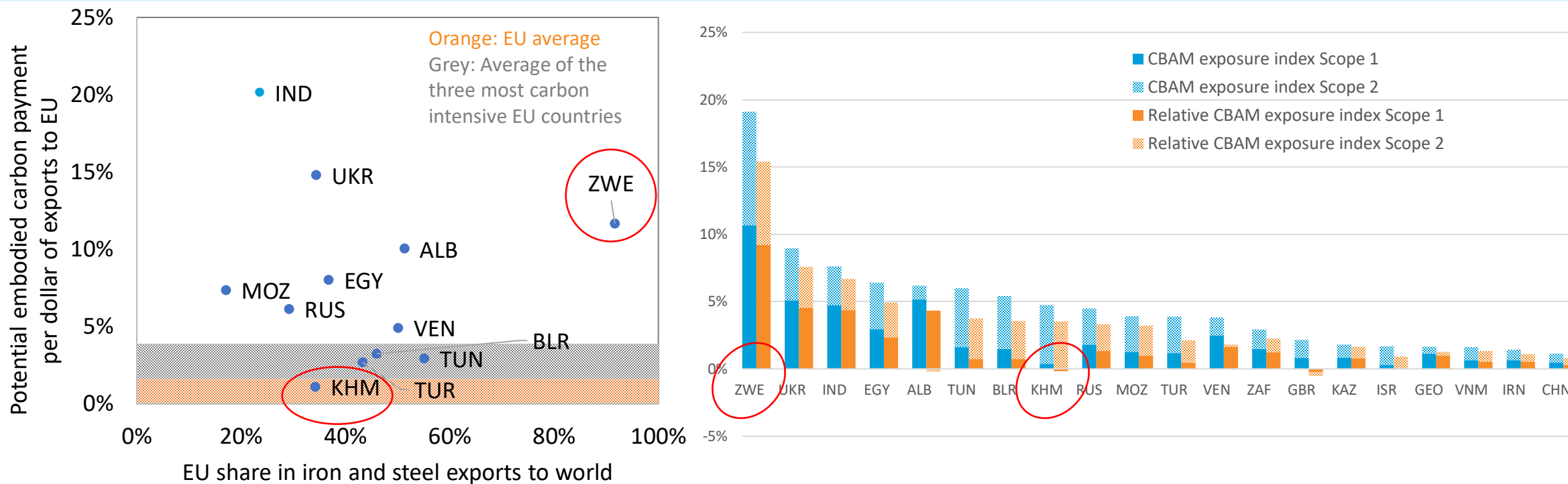
No.	GTAP	New sector	Description
1	Oxt	nmn	Non-metallic minerals mining
2		mio	Mining of iron ores
3		mao	Mining of aluminum ores
4		mco	Mining of copper ores
5		moo	Mining of other ores
6	Rpp	rbr	Rubber products
7		plp	Plastic products – primary
8		pls	Plastic products – secondary
9		plr	Recycling - plastics
10	I_s	isp	Iron and steel – primary
11		iss	Iron and steel – secondary
12		ris	Recycling - iron and steel
13		isc	Iron and steel casting
14	Nfm	app	Aluminum – primary
15		aps	Aluminum – secondary
16		ral	Recycling - aluminum
17		cpp	Copper – primary
18		cps	Copper – secondary
19		rcp	Recycling - copper
20		mpp	Other metals – primary
21		mps	Other metals – secondary
22		rom	Recycling - other metals
23		nfc	Non-ferrous metals casting

GTAP-CE database covers 141 regions
and 95 sectors

Carbon intensity (kg CO₂/USD) and the share of corresponding technology in output (%): EU-27+UK average

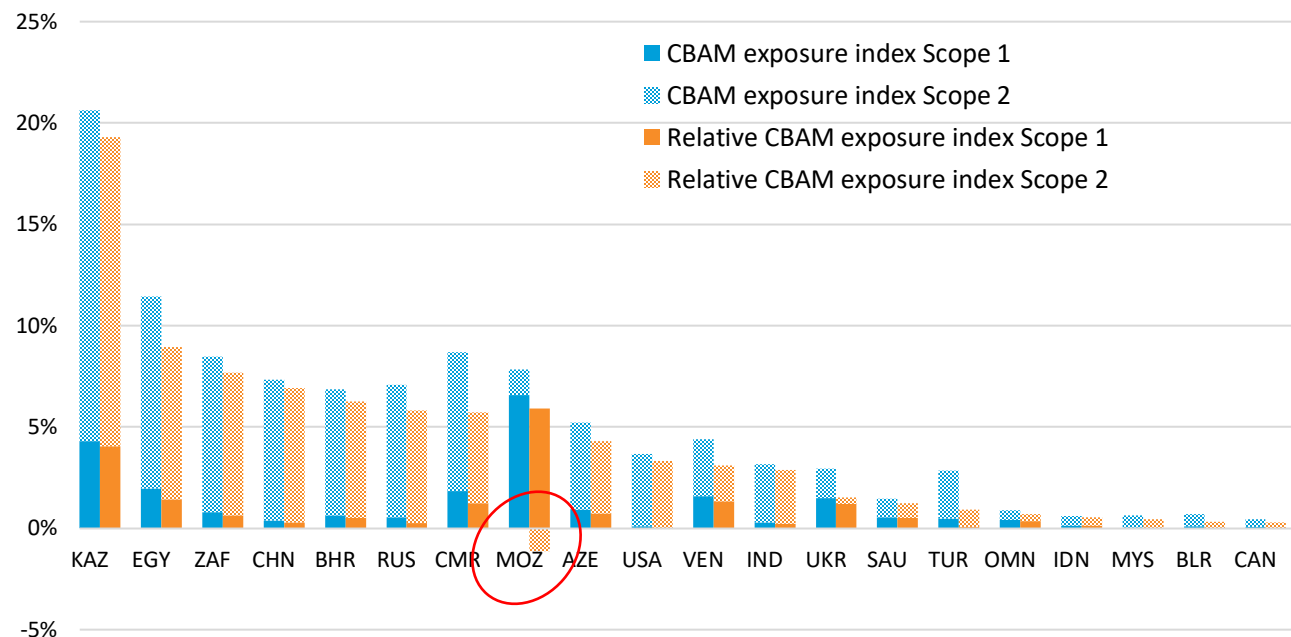
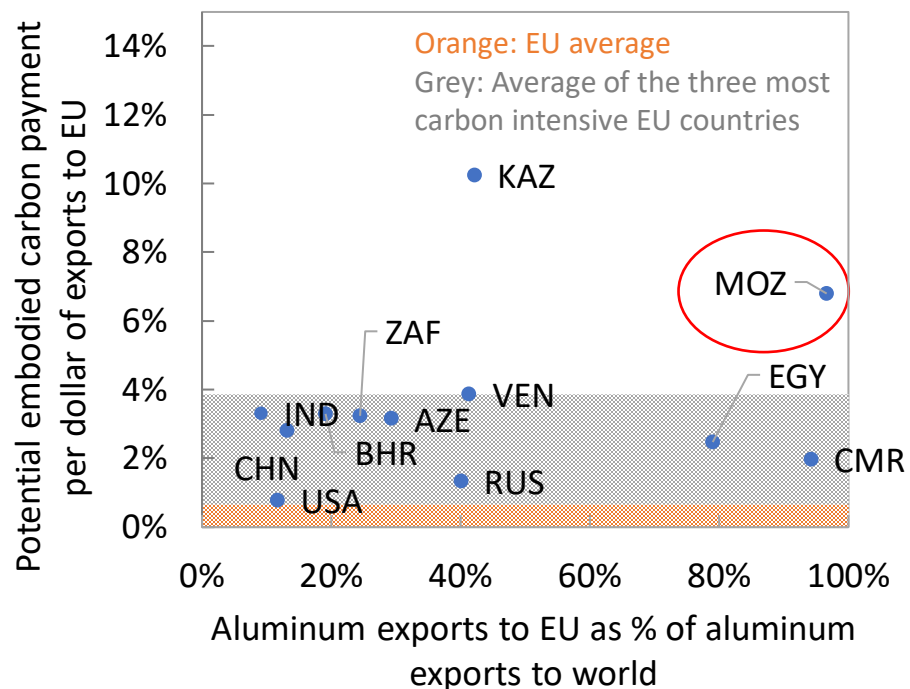


CBAM exposure index: iron and steel sector



- **Zimbabwe**'s iron and steel sector is the most exposed to CBAM (scope 1 and 2). It would benefit from domestic interventions to reduce the unpriced carbon footprint of the industry.
- **Cambodia** is relatively competitive in scope 1, so can maintain its current trade and production patterns, but less competitive compared to other EU trading partners if scope 2 is included.

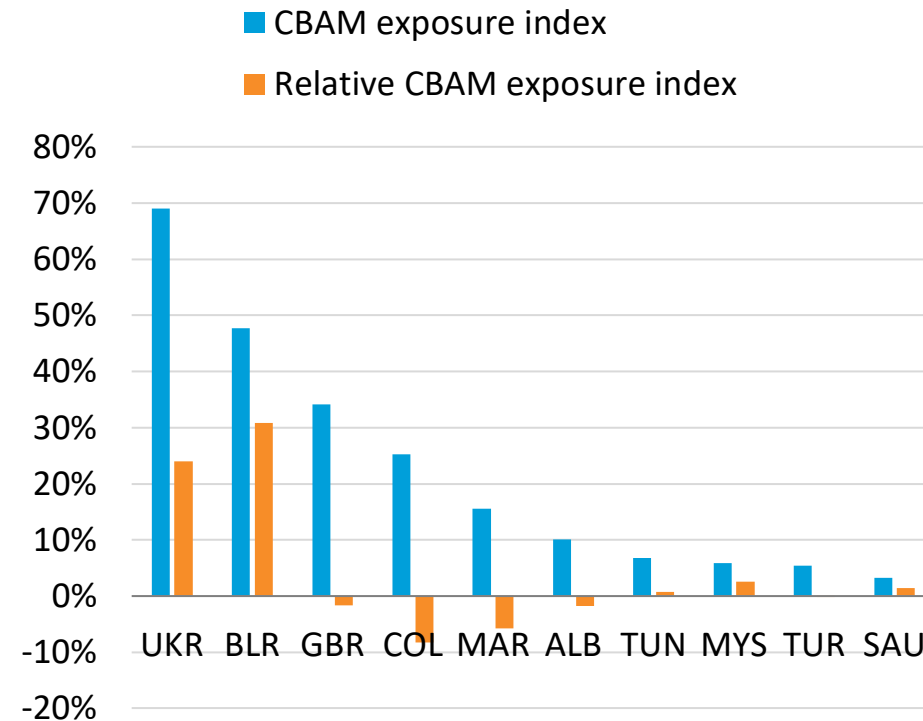
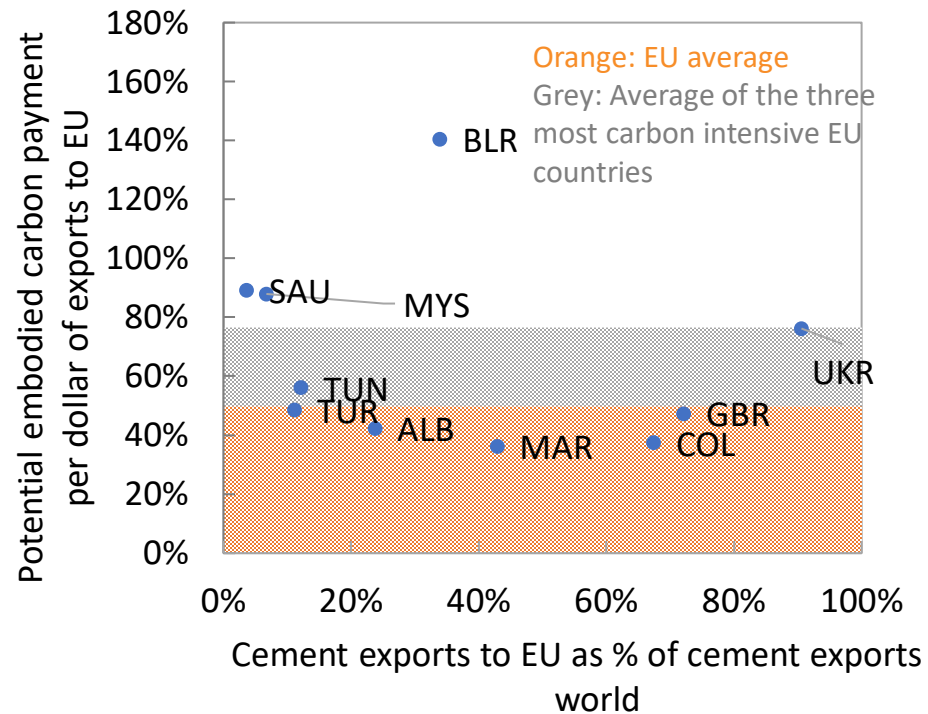
CBAM exposure index: aluminum sector



- **Mozambique's aluminum sector, as the most exposed to CBAM (scope 1),** would enjoy benefits from domestic reforms or international assistance to reduce carbon emissions of its primary aluminum production. However due to clean electricity generation, when scope 2 is included Mozambique is well positioned to compete on the EU market.
- When scope 1 and 2 are included, **Kazakhstan becomes the most exposed.**

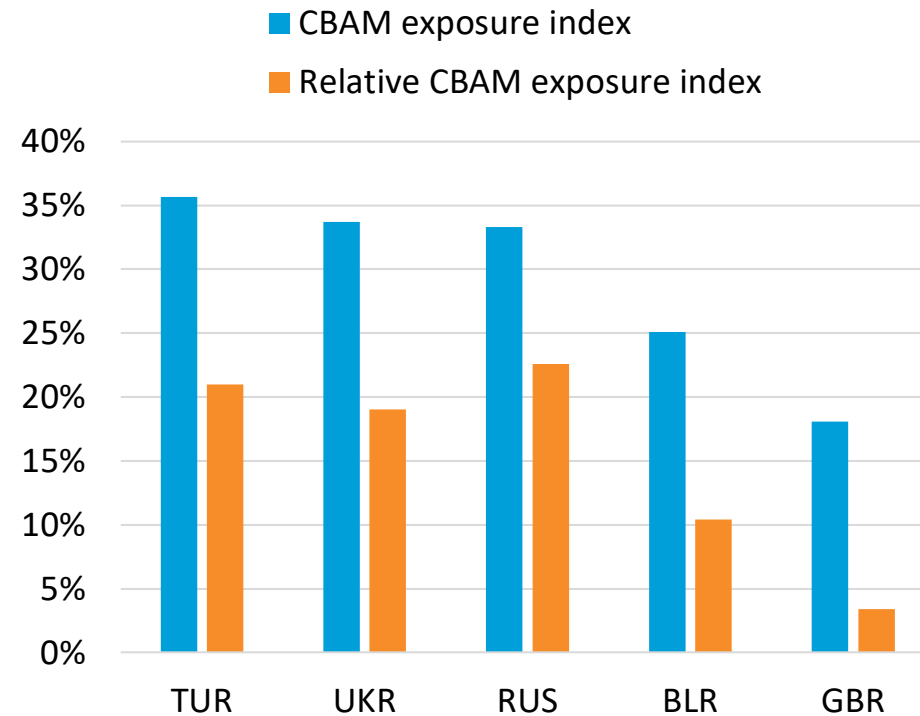
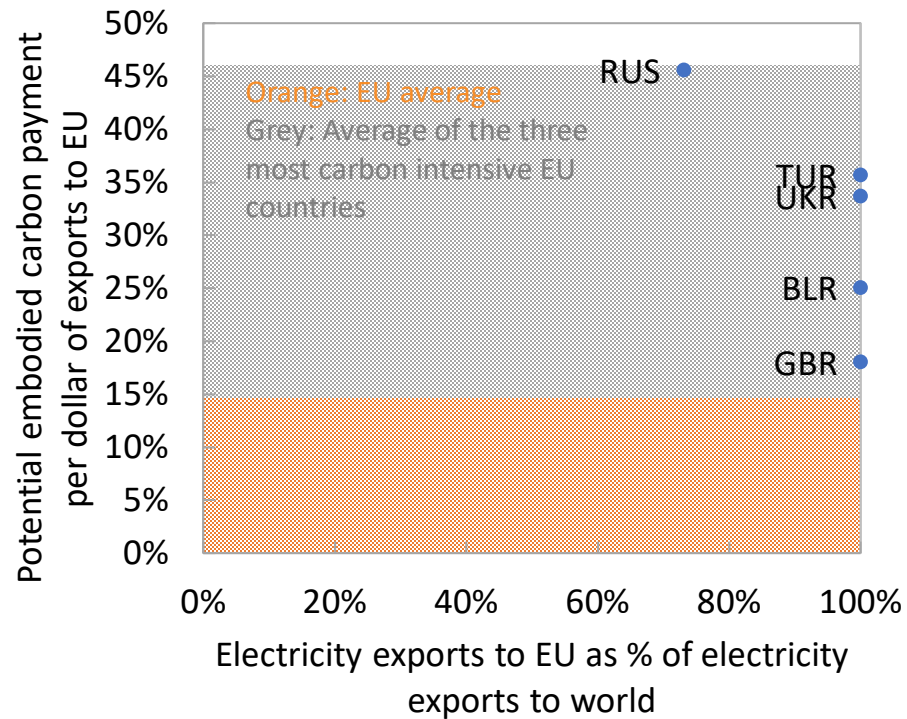
CBAM exposure index: Cement

- Given a large EU share and high carbon payment, **cement exporters in Ukraine** are identified as most exposed to the CBAM.
- Colombia and Morocco** are found to be relatively competitive in this industry.



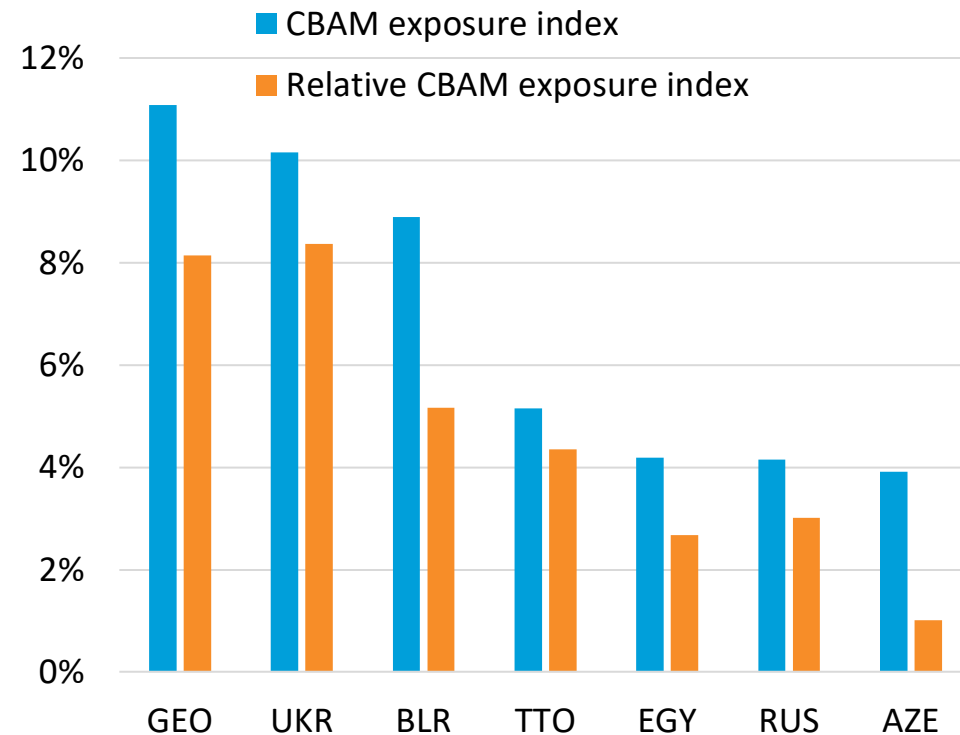
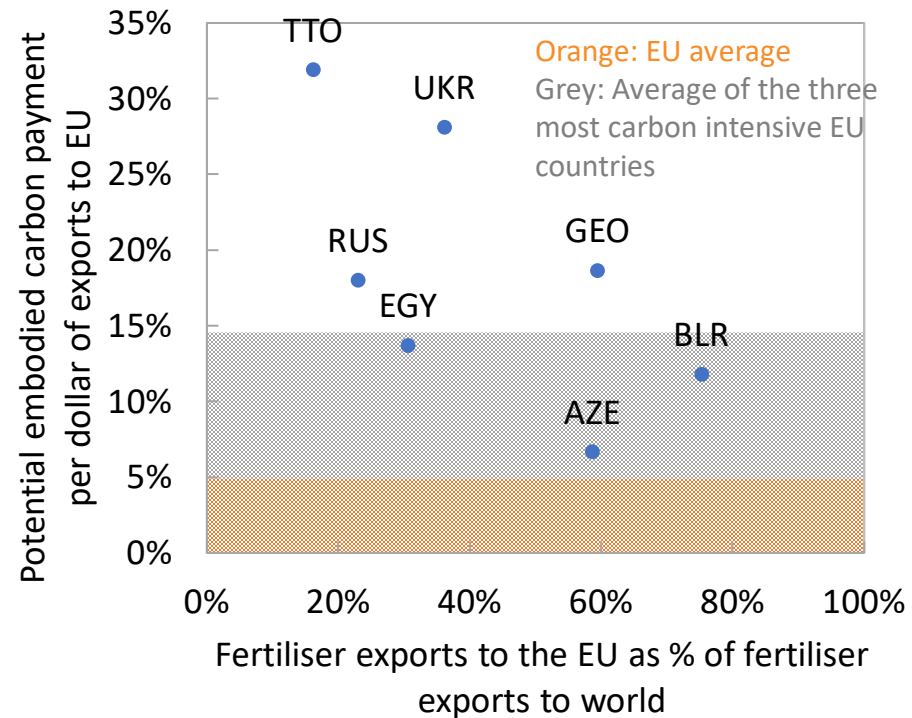
CBAM exposure index: Electricity

- **Turkey** is identified as most exposed to the CBAM in electricity.
- In relative terms, **Russia** loses more competitiveness.

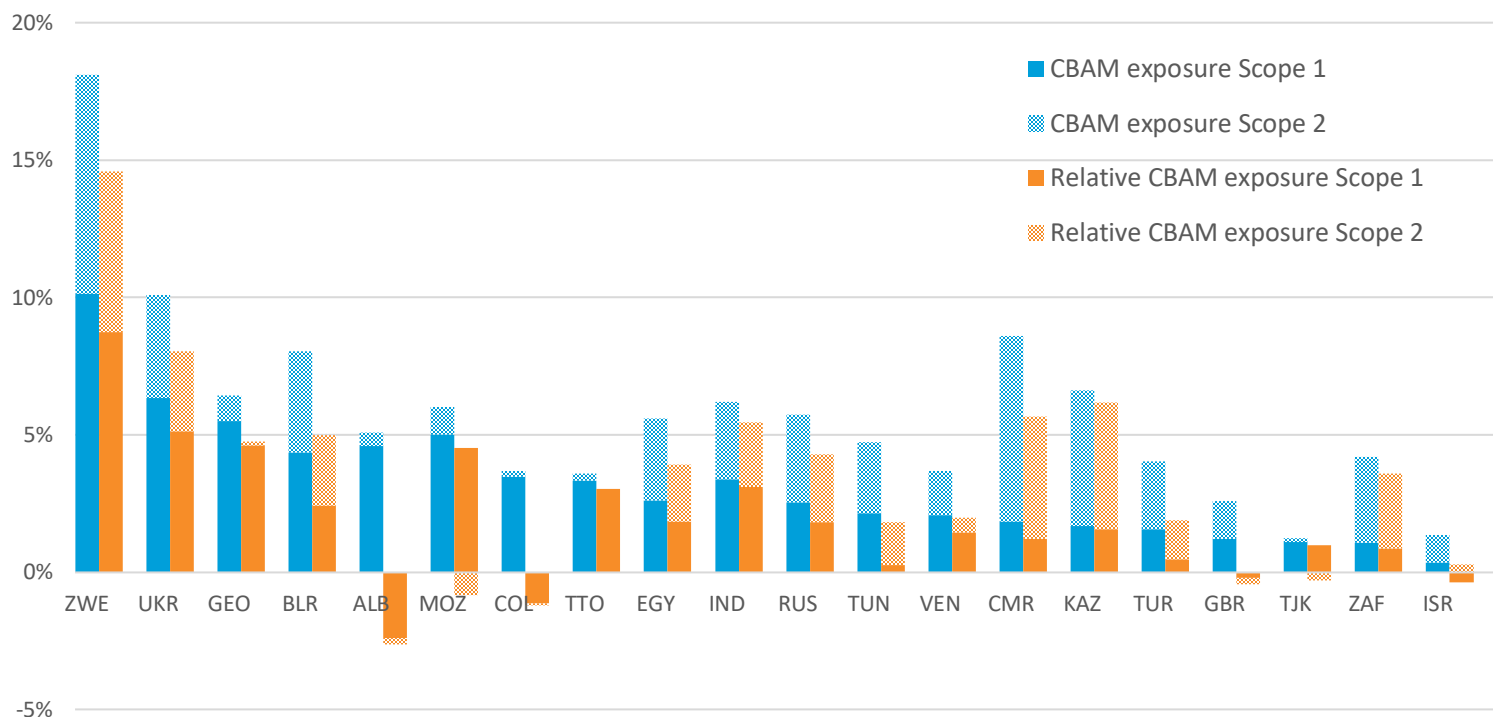


CBAM exposure index: Fertilizer

- Given a large EU share and high carbon payment, **fertilizer exporters in Georgia** is identified as most exposed to the CBAM.
- In a relative term, **Ukraine would become less competitive** than other exporters.



CBAM exposure index: aggregate index



Aggregate CBAM exposure index

$$= \frac{\sum_{s \in CBAM} X_{CS}^{EU} \cdot EI_{CS} \cdot \$100}{\sum_{s \in CBAM} X_{CS}^{World}}$$

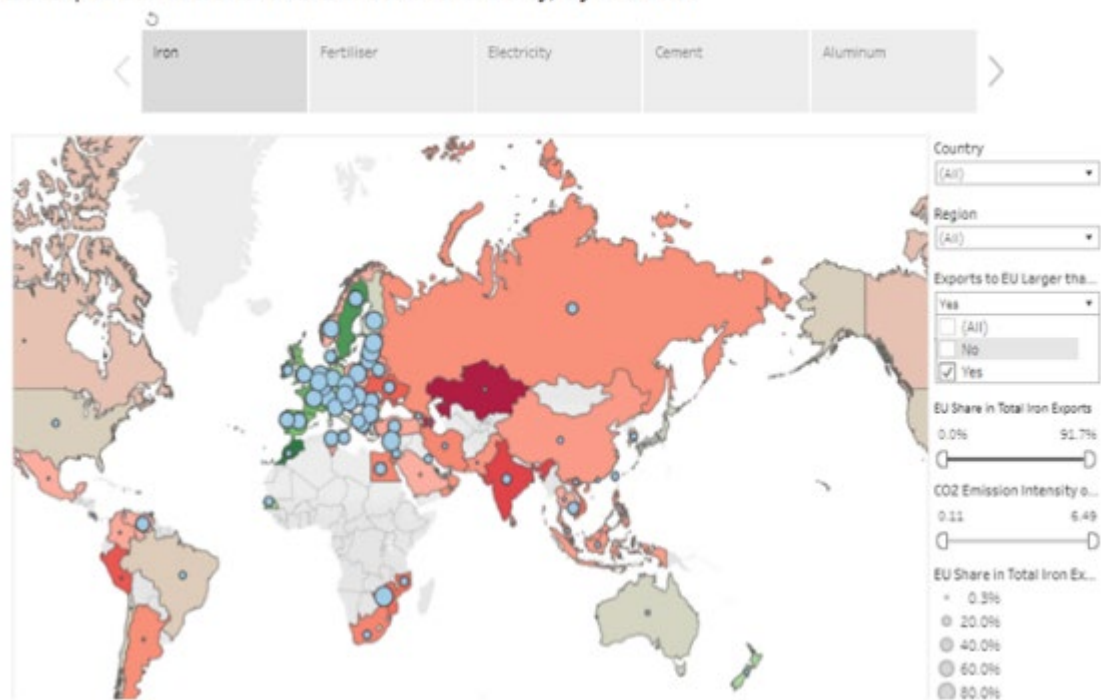
Aggregate relative CBAM exposure index

$$= \frac{\sum_{s \in CBAM} X_{CS}^{EU} \cdot (EI_{CS} - EI_{EUS}) \cdot \$100}{\sum_{s \in CBAM} X_{CS}^{World}}$$

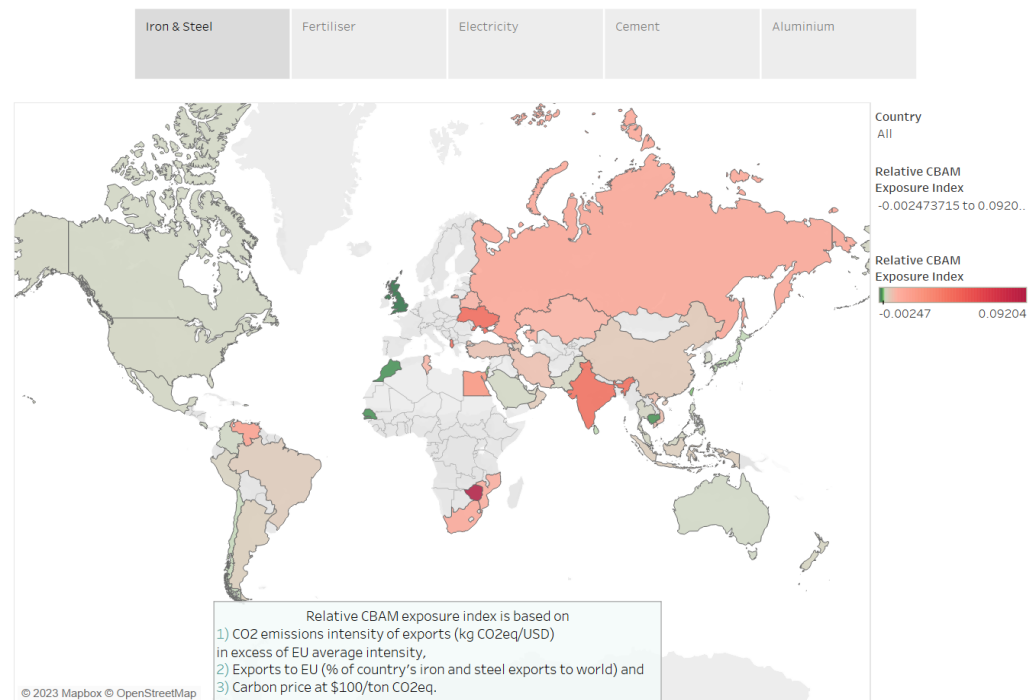
- Overall, **Zimbabwe and Ukraine are the most vulnerable to CBAM** in absolute and relative terms.
- **Albania** is found to gain most competitiveness in a relative term as it produces CBAM products in a cleaner way than the EU average.
- **Full data set:** <https://blogs.worldbank.org/trade/how-developing-countries-can-measure-exposure-eus-carbon-border-adjustment-mechanism>

CBAM Exposure Index

EU Export Share and CO2 Emission Intensity, by Product



Relative CBAM Exposure Index, by Product



Source: "Trade and Climate Change: Policy Considerations for Developing Countries" draft report (data), visualizations (forthcoming online)

- **CBAM exposure** index identifies countries with a high degree of emission intensity and trade exposure, setting the carbon price at US\$100 per ton CO₂e.
- Figure on the left shows EU share in country's product exports, CO₂ emission intensity, and CBAM exposure index in iron and steel sector; Figure on the right provides relative CBAM exposure index in iron and steel sector.

Private sector initiatives can also significantly contribute to climate effort

Global distribution of firms with science-based carbon emission

Region	Company	Small or Medium Enterprise	Financial Institution	Grand Total
Europe	1639	397	126	2162
Asia	677	246	37	960
North America	550	62	16	628
Latin America	101	20	3	124
Oceania	81	13	8	102
Africa	26	6	5	37
Grand Total	3074	744	195	4013

Private sector initiatives such as can also help decarbonization in developing countries:

- Larger firms in developed markets will require their suppliers to have a minimal to low carbon footprint to meet their targets;
- In the case of small to medium size enterprises in developing countries, the ability to measure and verify the product carbon footprint remains a challenge.



Policy considerations

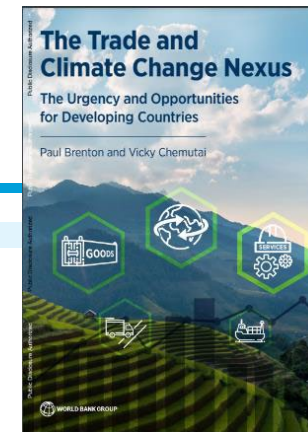
- Developing-country exporters that emit less than the EU benchmark benefit from the CBAM only if they can document and report their emissions. Otherwise, using the EU emission values as a benchmark could increase their exposure.
 - More emission-intensive exporters may benefit from using EU-determined default benchmark emission values, reducing the opportunity for cleaner producers to differentiate themselves.
- The data presented here are derived from a top-down approach that provides information on emission intensities at the sector level. In practice, the emissions intensities that determine the number of CBAM certificates required will be decided using a firm-specific, bottom-up approach.
- The countries identified as most vulnerable to the CBAM in this exercise are low-income countries where the capacity for emissions measurement and certification is likely to be weakest.
- Developing countries need support from advanced economies' governments, international organizations, and the private sector.
- They need financial and technical assistance in managing the transition, including addressing data gaps and building carbon tracing, measurement and certification infrastructure.

The role for the Trade Team

1. **Analytics:** Forthcoming report on “Trade and Climate Emergency:

Policy Considerations for Developing Countries”, contributions to over 20 CCDRs.

- Reform tariffs and NTBs to facilitate the flow of technology through access to environmental goods and services as well as technologies that reduce emissions.
- Assess the impacts of NDCs, EU CBAM and EU Deforestation regulation
- Understanding the impacts of EU Fit for 55, US IRA and China mitigation policies on developing countries
- Support regulatory agencies and economic agents to measure, trace and certify emissions and traceability of agricultural production
- Development of green logistics, assessment of green subsidies and environmental provisions in FTAs



2. Technical Assistance and knowledge-sharing: Action on Climate and Trade WB-WTO-WEF Provide participating economies with climate action analysis specific to their trade flows and national circumstances, accompanied by public-private dialogue to help stakeholders act on trade for climate mitigation and adaptation.

3. Financing through WB lending. A detailed Matrix of Trade Reforms that developing-country agencies and ministries can take to meet NDCs and National Adaptation Plans while maintaining export competitiveness.

THANK YOU!

