# Should Africa Turn South? Assessing the Impact of the CBAM on African Value Chains and the Change in Market Access for African countries

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# Should Africa Turn South? Assessing the Impact of the CBAM on African Value Chains and the Change in Market Access for African countries

Arnaud Persenda[1]

**Abstract:** This paper examines how the European Union's Carbon Border Adjustment Mechanism (CBAM) could reshape market access for African exporters and assesses whether alternative trade directions can mitigate emerging constraints. Focusing on CBAM-covered sectors, namely aluminium, iron and steel, cement, fertilisers, and hydrogen, the analysis first estimates the potential carbon cost faced by African producers by reconstructing CBAM allowances using official EU ETS benchmarks and CBAM default values, complemented by a CBAM-compliant novel Input-Output approach to measure carbon intensity of each country's upstream emissions of CBAM industries. The results highlight strong heterogeneity across sectors and countries. Aluminium, being the product that produces the highest amount of carbon emissions. While CBAM is likely to increase costs and reinforce existing asymmetries in EU-Africa trade, several Southern markets, including within Africa and parts of Asia, emerge as viable alternatives with lower regulatory barriers. The findings suggest that trade reorientation, combined with deeper regional integration under the AfCFTA and greater downstream value addition, can form part of a broader strategy to reduce vulnerability to carbon-related trade policies and support Africa's structural transformation.

**Keywords:** CBAM, Trade Policy, structural transformation, Global Value Chain, Africa, Developing countries, trade diversification

**JEL codes**: F13 F14 F18 O19 N17

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## 1. Introduction

To tackle the issue of carbon leakage, namely the offshoring of carbon-intensive production to countries with less stringent environmental regulations, the European Union (EU) has introduced a new policy instrument: the Carbon Border Adjustment Mechanism (CBAM). This mechanism seeks to impose a carbon price on certain goods imported into the EU so that these imports are subject to the same carbon costs as goods covered by the EU Emissions Trading System (ETS).

A distinctive feature of this policy is that the carbon intensity of a given product accounts not only for emissions generated at the planetary level, but also for the carbon intensity of other CBAM-covered goods used in its supply chain. At this stage, CBAM applies only to a limited number of sectors: cement, electricity, fertilisers, iron and steel, aluminium, and hydrogen. These sectors have been identified as the most carbon-intensive and the most exposed to carbon leakage.

This policy was presented as an instrument for the EU to reduce global emissions by closing the loophole of pollution havens. However, CBAM has generated a series of concerns from developing countries regarding its implementation and its impact on their economies.

Developing countries generally rely on more carbon-intensive production methods than advanced economies, which implies that their exports are more likely to be subject to higher carbon border taxes. Furthermore, Least Developed Countries, particularly in Africa, have limited capacity to comply with stringent production standards. Beyond these structural constraints, they are also likely to encounter significant administrative challenges, both in navigating the bureaucratic requirements associated with exporting to the EU and in ensuring adequate monitoring of CBAM-covered goods throughout their supply chains.

In this regard, African countries tend to be particularly vulnerable to the introduction of non-tariff barriers. Given their position as small economies and limited bargaining power, they generally act as policy takers in their bilateral relations with the EU. Moreover, African economies are expected to be among the most affected by both the direct and indirect repercussions of the trade policies introduced under the Trump administration.

This study seeks, first, to recontextualise the debate surrounding the CBAM within the broader discussion of non-tariff barriers and their implications for African economies. It then provides an estimation of the potential costs for African exporters based on the currently available benchmarks of the EU ETS and the default values adopted under the CBAM. Subsequently, the paper assesses the extent to which these benchmarks accurately capture the carbon intensity of production in key African sectors. Finally, we discuss the potential alternative destinations for products, based on tariff and non-tariff barriers, that may be adversely affected by the CBAM.

Section 2 discusses the theoretical framework of the implications of the CBAM for African countries, situating the discussion within the broader scholarship on non-tariff barriers to trade. Section 3 describes the database and the methodological framework. Section 4 presents and discusses the results. Section 5 Discusses potential alternative destinations. Section 6 offers concluding remarks.

## 2. Theoretical framework

### 2.1 General context

African countries are increasingly compelled to comply with rules that constrain their ability to pursue industrial and trade policies conducive to transformative growth. Pressures from multilateral institutions advocating trade liberalisation, combined with often more far-reaching North–South bilateral trade agreements, have further narrowed an already limited policy space, undermining the capacity of these countries to implement effective industrialisation strategies.

More recently, European trade policy has introduced an additional constraint through the CBAM scheduled to enter into force in 2026, CBAM will impose carbon pricing on imports entering the EU, with potentially significant implications for African exporters and their industrial development prospects.

The objectives of CBAM are threefold:

- First, it seeks to incentivise firms to reduce carbon emissions embedded in supply chains located outside Europe.
- Second, it aims to level the playing field by aligning the treatment of imports with that of EU producers, who are subject to the EU Emissions Trading System, while foreign producers are not.
- Third, it is intended to prevent carbon leakage, whereby European firms shift production or sourcing to jurisdictions with weaker environmental standards.

More broadly, CBAM fits within a long trajectory of policies through which developed economies have imposed regulatory requirements on developing countries. Some of these measures pursue widely endorsed goals, including enhanced human rights protections, stronger labour standards, and more stringent environmental regulations. However, they often generate substantial compliance costs for firms in developing countries. Other requirements pursue more contested objectives, such as tighter intellectual property rights, expanded protections for foreign investors, trade liberalisation commitments, regulatory harmonisation, and governance reforms.

The official objective of CBAM is to leverage the economic weight of the EU single market to induce regulatory change across much of the global economy in support of climate objectives. Environmental standards are undeniably important, as they serve as benchmarks for production methods and signal expectations to both firms and consumers. Furthermore, standards improve efficiency and coordination in increasingly fragmented supply chains, spread across multiple countries and suppliers, by ensuring that intermediate inputs such as components, materials, and semi-finished goods are compatible and function together without friction. In the automotive industry, for instance, standards guarantee that parts produced by different suppliers, including brakes, engines, and electronic systems, integrate seamlessly into the final vehicle.

While this objective can be interpreted as normatively positive, the mechanism also functions, in practice, as a protectionist industrial policy. These standards impose adjustment pressures that are unevenly distributed. CBAM compels developing countries, many of which have limited productive capabilities and often rely on more carbon-intensive production processes, to compete with European firms on production standards tailored to European industries' best practices.

This dynamic is reinforced by the EU’s role as a de facto global standard-setter; the EU exerts significant influence over regulatory norms across multiple industries, shaping production practices well beyond its borders (Bradford, 2020). Furthermore, European countries are the primary destination for African exports of manufactured goods (Persenda, 2025),

Compliance with standards is relatively straightforward for firms that are already established producers and possess the technological and organisational capabilities required to upgrade their practices. By contrast, many African manufacturers lack such capabilities. For these firms, standards effectively operate as non-tariff barriers, as they are unable to adopt European production requirements.

Even when compliance is feasible, meeting standards raises production costs, since firms must invest in research and development, capital equipment, and workforce training to adjust to new manufacturing processes. These higher costs, however, do not necessarily translate into higher prices. African manufacturers typically operate in highly competitive markets, while their Northern buyers, often European retailers, exert significant market power that limits price pass-through. As a result, compliance with standards frequently leads to compressed margins and reduced profitability for African firms (Andreoni, 2019; Nadvi, 2008; Ponte, 2007).

Moreover, firms are not equally positioned in the process of setting standards. Northern actors dominate the standard-setting agenda, exert influence over the regulatory bodies responsible for monitoring compliance, and are able to promote standards aligned with the interests and capabilities of their own manufacturers, while enforcing them extraterritorially.

Within this framework, African manufacturers face a growing proliferation of standards and regulatory authorities, which raises production costs and increases barriers to entry into new sectors. At the country level, this dynamic translates into a gradual erosion of regulatory autonomy. African economies are increasingly relegated to the role of standard-takers rather than standard-setters, compelled to adapt to externally defined rules over which they exercise little influence.

## 2.2 What is new with the CBAM

The CBAM was introduced to prevent carbon leakage from ETS sectors, which refers to the relocation of carbon-intensive production processes to countries with less stringent carbon regulations. The CBAM serves to level the playing field by taxing carbon emissions embedded in goods imported into the EU. Accordingly, CBAM goods correspond to the outputs of ETS-covered installations located outside the EU (Figure 1). Importers must buy CBAM certificates corresponding to the embedded emissions of their imported goods. The embedded emissions refer to the direct emissions generated by the production plant of the exporting company, resulting from electricity use and other carbon-emitting processes. They also include the emissions associated with the electricity consumption and carbon footprint of any CBAM-covered inputs (precursor) used during production. As expressed by the CBAM regulation: "*Where precursors are themselves complex goods, that process shall be repeated recursively until no more precursors are at stake*"[2].

CBAM certificates are based on the following formula:

$$Certificate^{CBAM} = (\text{Carbon intensity}^{\,CBAM} - \text{Benchmark}^{CBAM}) \times \text{Quantity} \times Price^{CBAM}$$

CBAM certificate prices are based on the price of EU ETS allowances. The CBAM certificate price reflects the average weekly price of ETS auction allowances, expressed in euros per tonne of $CO_2$ equivalent. CBAM revenues are collected by the EU and subsequently added to the EU budget.

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[2] Commission Implementing Regulation (EU) 2023/1773, Annex III, A.1(f), *OJ L 228, 17 August 2023.*(*Implementing Regulation - 2023/1773 - EN - EUR-Lex*, 2023)

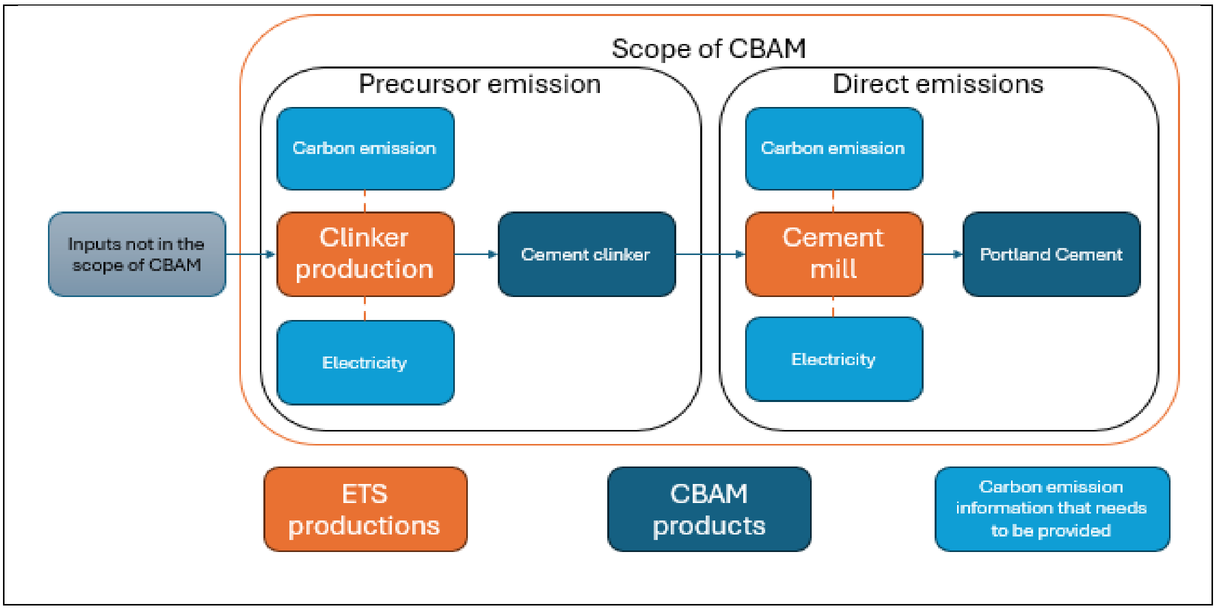

Figure 1 CBAM scope and link with the ETS

So far, six ETS-covered sectors fall within the scope of the CBAM regulation: “Electrical energy”, “Hydrogen”, “Aluminium”, “Cement”, “Fertiliser” and “Iron and steel”. The list of the CBAM goods can be found in the following document from the European Commission (2024) (See Table 5).

Although the CBAM currently targets a limited number of carbon-intensive products, of which the African countries are not major suppliers, this policy will be extended to a broader range of products, for which African countries are major suppliers to the European market. If the European Commission (2022) continues its current objective and extends the mechanism to a broader range of products, it will have significant implications for all African economies. Since the European market is the main destination for non-resource based African products, African firms risk either paying a higher trade cost to Europe, paying a high price to upgrade or being shut out of European supply chains (UNCTAD, 2022). An alternative would be that African countries develop their own carbon monitoring systems, and potentially regional carbon markets (African Climate Foundation & Firoz Lalji Institute for Africa, 2023).

This paper builds upon the work of Magacho et al. (2024), who estimate the impact of CBAM on developing countries using an input-output (IO) framework. In their analysis, sectoral emissions data are employed to construct an emission intensity index, which is then compared with EU averages. Magacho et al. (2024) subsequently apply a Leontief inverse to identify the upstream sectors most exposed to trade contraction resulting from the implementation of CBAM. However, this approach presents several methodological limitations.

A conventional Leontief inverse does not adequately reflect the specific design of the CBAM, which does not uniformly affect all segments of the value chain but primarily targets input providers supplying CBAM-covered products to exporters trading with the EU. Their approach introduces two distortions:

- It incorporates emissions from countries outside the scope of the regulation, namely EU member states and economies already operating a carbon market.
- It includes upstream emissions from industries that fall outside CBAM coverage, tracing all precursor emissions in the supply chains regardless of whether those industries are involved in the mechanism.

Despite these shortcomings, their findings underscore that developing economies are likely to bear a disproportionate share of the adjustment burden. This paper addresses these limitations by constructing a CBAM-compliant Leontief inverse that more faithfully reflects the regulatory perimeter of the mechanism.

The paper proceeds in three steps. It first establishes a baseline of CBAM payments using official EU data regarding the expected pollution level of each product. It then draws on a modified Leontief framework to estimate CBAM carbon emissions, which are compared against this baseline. A final contribution is an analysis of alternative export destinations for the affected products, with the aim of identifying plausible targets for trade diversification. The remainder of the paper is structured as follows. Section 3 details the methodology, Section 4 presents the results, Section 5 discusses alternative trade destinations and Section 6 concludes.

## 3. Methodology and data

### 3.1 CBAM certificates based on EU product-based estimations.

The first part of this section discusses how to get an assessment of African countries' carbon allowance payments, based on data published by the EU. In this section, we focus on four products: "Aluminium", "Cement", "Fertilisers", and "Iron and steel". They represent the most relevant broad categories of CBAM exports for African countries. Electricity exports to the EU concern only Morocco, while no African country appears to be a significant exporter of hydrogen to the EU.

Given that the CBAM benchmarks have not yet been disclosed, this analysis relies on the EU ETS benchmarks (Directorate-General Climate Action, 2021) and the default values established under the CBAM transitional regime (Directorate-General Taxation and Customs Union, 2023) to approximate the prospective cost implications of exports to the EU for African countries.

The EU ETS benchmarks ($\mathrm{Benchmark}^{ETS}$) are derived from the emission performance of the top decile of EU plants in each respective industry and therefore represent the most carbon-efficient production practices within the Union. By contrast, the CBAM default values ($\mathrm{DV}^{\,CBAM}$) correspond to estimated emission intensities for non-EU producers and are generally higher, reflecting greater expected reliance on carbon-intensive technologies, lower energy efficiency, and comparatively weaker environmental standards.

Building on this framework, the aggregate CBAM certificates $\left(\widehat{Certificate}_{i,2026}^{CBAM}\right)$ associated with exporters from country $i$ are estimated as follows:

$$\widehat{Certificate}_{i,2026}^{CBAM} = (\mathrm{DV}^{\,CBAM} - \mathrm{Benchmark}^{ETS}) \times \widehat{\mathrm{Quantity}}_{\,i} \times \widehat{Price}_{2026}^{CBAM}$$

The prices of CBAM certificates are updated weekly, reflecting the average $CO_2$ emission allowance prices (ETS prices) from the preceding week. The volume of exports to EU countries ($\widehat{\mathrm{Quantity}}_{\,i}$) will be measured using 6-digit export data from the CEPII BACI database (Gaulier & Zignago, 2010), we will rely on the last available year 2023.

To estimate the potential CBAM prices for 2026 ($\widehat{Price}_{2026}^{CBAM}$), I rely on data from 2024–2025, using the average ETS prices observed over the last 12 months, from 1 October 2024 to 1 October 2025.

$$\widehat{Price}_{2026}^{CBAM} = Average\ (Price_{Last\ 12\ months}^{ETS})$$

$CO_2$ emission allowance prices are obtained from the EU ETS primary market auctions, as reported by the Instrat Foundation (2025).

## 3.2 Identifying the most impacted industries.

The second stage evaluates the accuracy of CBAM default values in approximating emissions from African industries. To this end, carbon emissions are estimated for all countries exporting to the EU, allowing African industries to be positioned within the global distribution of emission intensities. For this purpose, a CBAM Emission Index (CBAM-EI) is constructed. This sector-level indicator is designed to approximate the carbon emissions embodied in CBAM-covered industries exporting to the EU.

The calculation of CBAM-related emissions is based on two key components:

(i) The carbon emitted during the production process within the exporting country. Mainly the GHG generated by running a factory and the emissions from the electricity consumed by the production

(ii) The carbon embedded in intermediate inputs identified as CBAM-covered products (precursor goods). Since firm-level data on value chains for exporters to the EU are generally unavailable for developing economies, and particularly for African countries, I employ sectoral IO data as a proxy.

To achieve this, I use sectoral carbon emission intensity data from EORA's environmental satellite database (Lenzen et al., 2013), which provides an extensive level of resource use and carbon emission at the sectoral level at the ISIC Rev. 4.

To assess the carbon embodied in intermediate inputs, I use the 2025 edition of the OECD Inter-Country Input-Output (ICIO) database, which provides IO linkages for 80 economies over the period 1995-2022. The dataset covers 38 OECD member countries and 42 non-OECD economies for 50 industries using an ISIC Rev. 4 classification. It includes 11 African countries: Angola, Cameroon, Côte d'Ivoire, the Democratic Republic of Congo, Egypt, Morocco, Nigeria, São Tomé and Príncipe, Senegal, Tunisia, and South Africa. This database was selected despite its relatively limited coverage of African economies, especially compared to EORA, as it provides greater accuracy in representing developing countries by not relying on a representative IO table for those lacking national IO or Supply and Use Tables.

On the ICIO database, I retain only:

- Inter-sectoral flows involving sectors producing CBAM-covered goods. This allows us to construct an IO table specific to CBAM products, thereby enabling the identification of supply chains composed exclusively of precursor goods.
- As there is no double taxation allowed according to the CBAM rules, countries covered by the EU ETS, or countries with fully linked domestic ETS (EEA, EFTA countries), will not be accounted kept in the ICIO database.

This approach rests on the core assumption that firm-level value chains mirror, to a reasonable extent, industry-level value chains. While this assumption introduces some aggregation bias, it enables consistent cross-country and cross-sectoral estimation of the carbon exposure of African industries within the CBAM framework.

The objective of this section is to establish a comparative ranking of the carbon intensity of African products and supply chains relative to their Asian counterparts, in accordance with CBAM requirements.

We first construct matrix **A**, which captures the share of total production originating from each industry. The database is then truncated into the matrix **V** to retain only CBAM-covered industries, resulting in an IO table restricted to CBAM products. It is also restricted to non-EU countries, as EU countries are already subject to EU-ETS. This enables the estimation of carbon emissions of only CBAM industries that are supplying to each other. This restriction prevents the Leontief inverse from attributing carbon emissions originating in CBAM-covered upstream inputs that are embedded within non-CBAM inputs. By doing so, it avoids spurious propagation paths in which emissions are indirectly transmitted from a CBAM good to a non-CBAM good and then back to a CBAM good, which would otherwise counter the logic of CBAM accounting.

This truncated IO matrix forms the basis for computing the Leontief inverse (L). The Leontief inverse expands as a geometric series, allowing emissions to be recursively aggregated along the value chain of CBAM-covered goods.

$$\mathrm{L} = (I - V)^{-1}$$

$$Total\ emissions_p = fLy$$

$f$ is a vector of total emission intensity. $y$ is the vector of demand from the EU sectors. L is the Leontiev inverse. $Ly$ is the output needed to satisfy the final demand from EU sectors.

$$Emission\ intensity_j = \frac{Total\ emissions_j}{Total\ export\ to\ the\ EU_j}$$

The CBAM emission intensity (CBAM-EI) of African countries will then be compared with the corresponding CBAM-EI of other exporters to the EU.

## 3.3 Identifying alternative markets

The objective of this final part is to identify potential trade partners with low entry costs beyond existing trade patterns for EU-bound, CBAM-covered goods. The analysis focuses primarily on technical non-tariff measures, namely “Sanitary and Phytosanitary measures” (SPS) and “Technical Barriers to Trade” (TBT) as these instruments directly regulate production processes and require additional resources for compliance, and therefore constitute major constraints for producers in developing countries.

In the trade literature, Non-Tariff Measures (NTMs) have long been examined for their impact on trade flows. Most empirical work relies on one of two main sources: UNCTAD’s TRAINS database or WTO notifications from ITIP. Static analyses tend to prefer TRAINS because of its detailed classification, although its limited country coverage and infrequent updates constrain time series analysis. Since TRAINS reflects a snapshot of measures in force at the time of data collection, irregular updates make it unsuitable for tracking yearly changes.

WTO notification data covers more countries and more years, but it lacks withdrawal dates for key categories such as SPS and TBT. Moreover, the notification year does not necessarily coincide with the implementation year, which can distort AVE estimates. Not all NTMs require WTO notification. Countries are expected to report only measures introduced or amended after 1995, those that deviate from existing international standards or apply in areas where such standards are absent, and those likely to have a significant effect on trade (Ikeme et al., 2024).

## 4. Results

The results section is structured in two parts. The first part determines the size of CBAM allowances using currently available benchmarks, and the second part provides carbon emission levels, based on a customised Leontief IO model adapted to CBAM allowance accounting.

### 4.1 Estimating CBAM allowance

### Price of CBAM allowances

This subsection examines each component of the CBAM allowance estimator. It starts with the carbon price, then identifies the main exporters of CBAM-covered products and concludes with a comparison between ETS benchmarks and CBAM default values. Weekly carbon allowance prices are computed as the average of prices observed during the previous week. Since prices for the coming year are not observable, the analysis relies on the historical market average derived from the most recently available data.

Figure 2 presents the evolution of daily EU ETS carbon prices (EUR/t$CO_2$) in the primary market since 2012. The carbon price rose from below €20 per tonne in 2018 to a peak of €97.51 in February 2022. Prices have exhibited an upward trend as the ETS has been progressively phased in. Further increases in carbon prices in the coming years are expected to erode the competitiveness of non-EU firms that are not operating at the technological frontier of carbon efficiency, particularly those based in developing countries. The average price in the primary market over the past twelve months, from 1 October 2024 to 1 October 2025, is 70.11 euros per tonne of $CO_2$. This value will serve as our CBAM price $\widehat{Price}_{2026}^{CBAM}$.

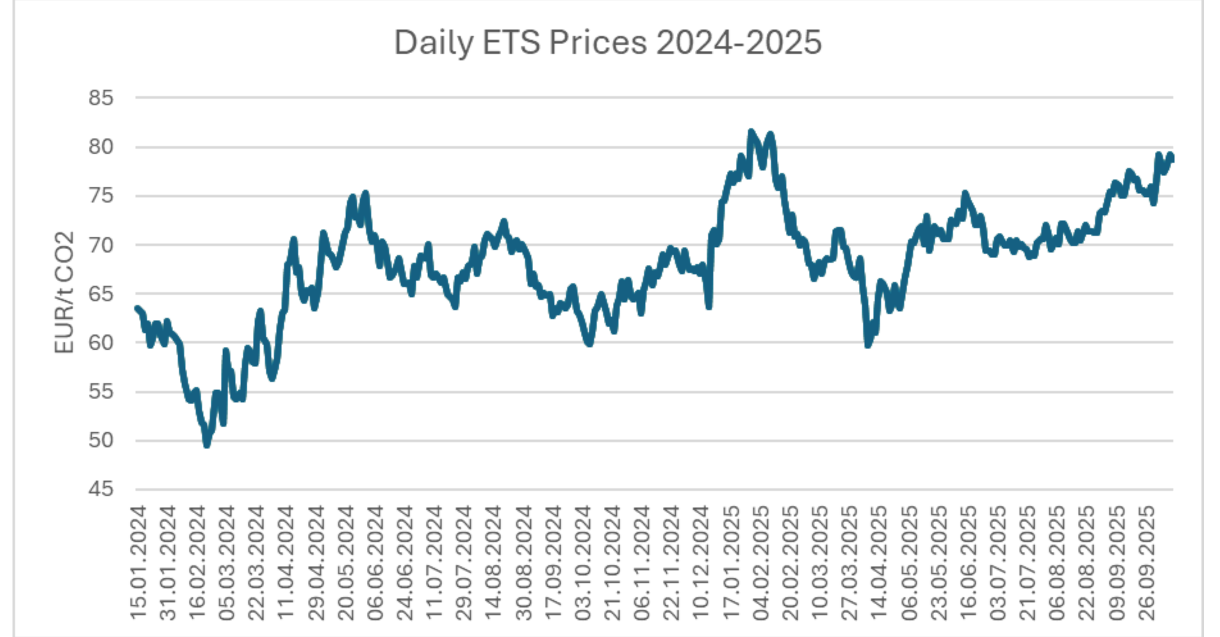

Figure 2 Daily ETS Prices
Source: $CO_2$ emission allowance prices are obtained from the EU ETS primary market auctions, as reported by the Instrat Foundation in ‘Price of CO2 Emission Allowances EU ETS’( 2025)

## Which African countries export CBAM goods to Europe?

The second subsection identifies the major African exporter of CBAM covered goods toward the EU countries. A fine-grained identification is essential, since each product line is subsequently assigned a distinct carbon emissions profile.

Table 1 ranks African countries by the total value of their exports of CBAM goods to EU ETS countries, disaggregated by product category. The data reveal a strong geographical concentration of exports, with a limited number of countries accounting for the majority of trade flows. The iron and steel industry appears to be the most exposed to the CBAM, with total African exports amounting to 3,214 million USD, primarily driven by South Africa (1,660 million USD), Egypt (348 million USD), and Tunisia (270 million USD). The fertiliser industry follows, with exports reaching 2,923 million USD, dominated by Egypt (1,247 million USD), Morocco (719 million USD), and Algeria (684 million USD), highlighting the strong presence of North African producers. The aluminium industry ranks third, with exports totalling 2,585 million USD, led by Mozambique (1,058 million USD), South Africa (778 million USD), and Egypt (491 million USD), which together account for the bulk of the continent’s shipments in this category.

Exports of electrical energy remain modest, amounting to 36 million USD, mainly originating from Morocco. There is no significant export of hydrogen to the EU ETS. Overall, the data underscore both the geographical concentration and the sectoral asymmetry of Africa’s CBAM-related exports to the EU ETS market.

*Table 1 Top African exporters of CBAM goods to EU ETS countries in million USD for the Year 2023*

| Rank | Aluminium | | Cement | | Electrical energy | | Fertiliser | | Iron and steel | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **Mozambique** | 1058 | **Algeria** | 125 | **Morocco** | 36 | **Egypt** | 1247 | **South Africa** | 1660 |
| 2 | **South Africa** | 778 | **Tunisia** | 67 | **Gabon** | 0 | **Morocco** | 719 | **Egypt** | 348 |
| 3 | **Egypt** | 491 | **Egypt** | 44 | **Algeria** | 0 | **Algeria** | 684 | **Tunisia** | 270 |
| 4 | **Ghana** | 90 | **Morocco** | 27 | **Angola** | 0 | **Nigeria** | 143 | **Liberia** | 262 |
| 5 | **Cameroon** | 75 | **Gabon** | 2 | **Benin** | 0 | **Tunisia** | 68 | **Mauritania** | 209 |
| 6 | **Morocco** | 53 | **Senegal** | 1 | **Botswana** | 0 | **Libya** | 60 | **Algeria** | 148 |
| 7 | **Tunisia** | 23 | **South Africa** | 1 | **Burkina Faso** | 0 | **South Africa** | 3 | **Libya** | 127 |
| 8 | **Mauritius** | 5 | **Cameroon** | 0 | **Burundi** | 0 | **Namibia** | 0 | **Zimbabwe** | 80 |
| 9 | **Angola** | 4 | **Côte d'Ivoire** | 0 | **Côte d'Ivoire** | 0 | **Mauritius** | 0 | **Morocco** | 78 |
| 10 | **Nigeria** | 4 | **DR. Congo** | 0 | **Cabo Verde** | 0 | **Rwanda** | 0 | **Gabon** | 6 |
| 11 | **Tanzania** | 1 | **Nigeria** | 0 | **Cameroon** | 0 | **Senegal** | 0 | **Senegal** | 4 |
| 12 | **Sierra Leone** | 1 | **Sudan** | 0 | **Cent. Afr. Rep.** | 0 | **DR. Congo** | 0 | **Niger** | 4 |
| 13 | **Ethiopia** | 0 | **Benin** | 0 | **Chad** | 0 | **Zambia** | 0 | **Zambia** | 3 |
| 14 | **Kenya** | 0 | **Mali** | 0 | **Comoros** | 0 | **Burkina Faso** | 0 | **Côte d'Ivoire** | 3 |
| 15 | **Algeria** | 0 | **Ghana** | 0 | **Congo** | 0 | **Djibouti** | 0 | **Mozambique** | 2 |
| 16 | **Madagascar** | 0 | **Angola** | 0 | **DR. Congo** | 0 | **Ghana** | 0 | **Sierra Leone** | 2 |
| 17 | **Senegal** | 0 | **Mauritius** | 0 | **Djibouti** | 0 | **Cameroon** | 0 | **Cameroon** | 1 |
| 18 | **Namibia** | 0 | **Congo** | 0 | **Egypt** | 0 | **Kenya** | 0 | **Namibia** | 1 |
| 19 | **Côte d'Ivoire** | 0 | **Cabo Verde** | 0 | **Equa. Guinea** | 0 | **Uganda** | 0 | **Angola** | 1 |
| 20 | **Eswatini** | 0 | **Togo** | 0 | **Eritrea** | 0 | **Côte d'Ivoire** | 0 | **Mauritius** | 1 |
| 21 | **Liberia** | 0 | **Madagascar** | 0 | **Eswatini** | 0 | **Madagascar** | 0 | **Nigeria** | 1 |
| 22 | **Zimbabwe** | 0 | **Tanzania** | 0 | **Ethiopia** | 0 | **Sudan** | 0 | **Tanzania** | 1 |
| ∑Africa | | **2585** | | **297** | | **36** | | **2923** | | **3214** |

Note: EU ETS countries include EU member states, Norway, and Iceland. Hydrogen exports to the EU ETS fall below the one-million-euro threshold per country and are therefore not shown in the table. Source: Author's computation based on BACI (CEPII) database for the year 2023.

## What is the difference between ETS benchmark and CBAM DV?

The ETS benchmarks provided by the EU are based on industry-level allowances established by the Directorate-General Climate Action (2021). This analysis uses the benchmark values from the first part of Phase 4, corresponding to the period 2021-2025, as the updated benchmarks for the second part of Phase 4 (2026-2030) are expected to be published next year.

Since the ETS industry categories do not adhere to a standardised industrial nomenclature, they were manually matched with the corresponding 2-digit and 4-digit product HS classifications. (See Appendix 1 to get an explanation of the matching process).

The CBAM DV used in this paper are based on data from the Directorate-General for Taxation and Customs Union (2023), which in turn rely on the technical report by the Joint Research Centre (2023). These default values represent the average of the JRC's estimated carbon emissions associated with imports from non-EU countries.

The CBAM DV are provided using a mix of 4-, 6-, and 8-digit CN classifications. We match these classifications at the 6-digit level with the CEPII BACI database (See **Error! Reference source not found.** to get an explanation of the matching process).

Comparing the ETS benchmarks to produce specific goods with the CBAM DV provides useful insights into which products are likely to face the highest additional costs when exported to the EU (See *Figure 3*). All products showing a difference greater than 7.5 primarily belong to the aluminium sector.

Figure 3 provides a breakdown of these differences by product type. The largest discrepancies are observed in the aluminium sector, with an average difference of 9.91 tonnes of $CO_2$ per tonne of product across the 31 product lines. This is followed by the iron and steel sector, with an average difference of 2.26 tonnes, and then by the fertiliser and cement industries.

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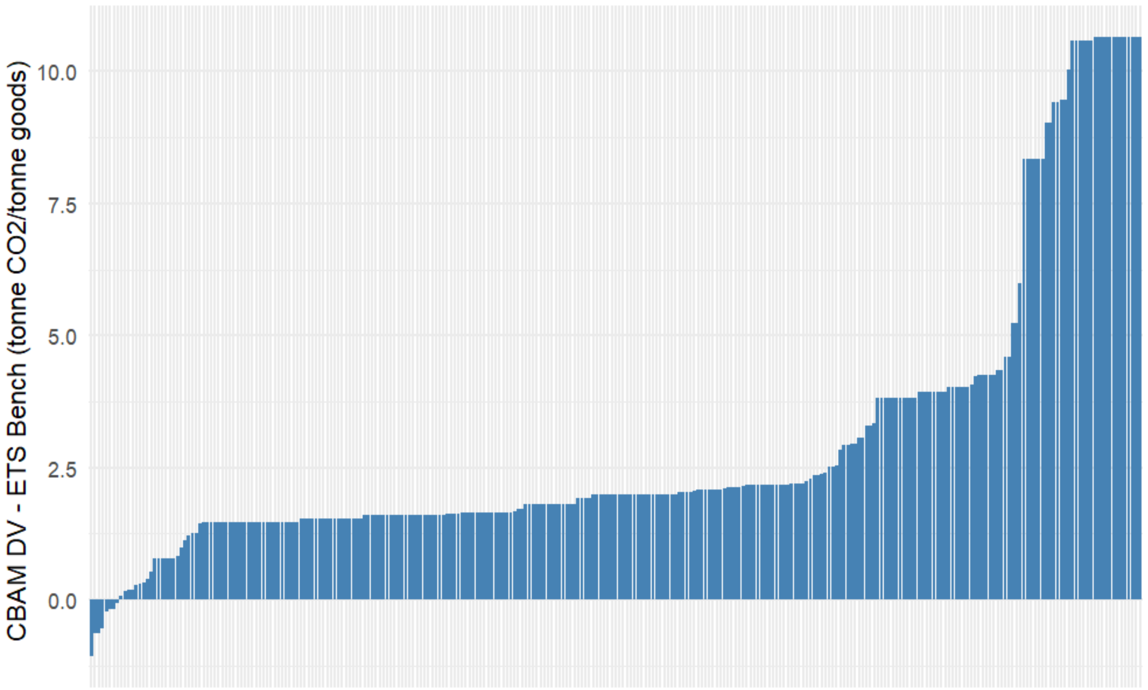

Figure 3 Difference between CBAM DV vs ETS Benchmark per product

Table 2 Differences between the CBAM DV and the ETS Benchmarks

| | Differences | | | |
|---|---|---|---|---|
| **Type** | **Average** | **Maximum** | **Minimum** | **Number** |
| Aluminium | 9.91 | 10.6 | 8.34 | 31 |
| Cement | 0.194 | 1.21 | -0.637 | 6 |
| Fertiliser | 0.575 | 4.02 | -1.08 | 20 |
| Iron and steel | 2.26 | 5.99 | 0.782 | 201 |

### Estimating the CBAM certificate based on benchmark default values

Bringing all elements together using the CBAM certificate formula yields the results presented in Table 3. There are 3 countries expected to make a large payment, South Africa, Mozambique and Egypt. South Africa remains the most heavily affected country under this policy, with expected payments of USD 819 million over the next year. It is followed by Mozambique, which is expected to pay USD 665 million, largely driven by aluminium exports to the EU. Egypt ranks third, with estimated payments of USD 408 million. Aluminium production is the primary driver of CBAM-related carbon payments for African countries.

Other key countries, such as Morocco (EUR 78 million) and Tunisia (EUR 65 million), will be largely preserved, as their exports are not among the targeted goods. The industrial products they export are mostly downstream of the goods currently covered by CBAM. A key advantage of these countries is their specialisation in downstream assembly activities. This implies the use of CBAM-relevant inputs such as aluminium, iron, and steel, but once transformed into manufactured products, these goods are not yet subject to CBAM. However, planned extensions of CBAM to downstream products that incorporate CBAM-covered inputs could pose significant risks for these countries.

## 4.2 CBAM estimating deviations

This section concludes by introducing an alternative measure of CBAM-related carbon emissions. Relying on an inverse Leontief approach, restricted to CBAM-covered goods, this method makes it possible to replicate CBAM accounting rules by tracing upstream production stages until no further predecessor can be identified.

This alternative metric sheds light on a different dimension of CBAM, namely the role of national supply chains in shaping carbon intensity. Within the logic of CBAM, the origin of inputs becomes a critical determinant of embedded emissions. Examining carbon intensity by industry, therefore, provides information on which countries operate relatively cleaner supply chains. Figure 5 to Figure 9, in Appendix III present, full country rankings of emission intensity by industry. These rankings are intended to inform policymakers about whether domestic producers are likely to face higher or lower CBAM costs relative to other developing countries.

In the **fertiliser sector**, among the eight African countries represented in the ICIO database, the three most carbon-intensive supply chains under CBAM accounting are Senegal (ranked 11th), South Africa (12th), and Nigeria (15th). However, their carbon intensity is roughly half that of the most carbon-intensive producers in this sector, namely Ukraine, Russia, and Bahrain.

In the **cement sector**, Tunisia (5th) and Egypt (7th) rank relatively high in terms of carbon intensity, followed at a considerable distance by South Africa (15th), Morocco (16th), and Senegal (17th).

For **basic metals**, which include both steel and aluminium, South Africa ranks as the second most carbon-intensive producer, immediately after Russia. Given that aluminium is the most significant CBAM-covered product exported to the EU, this result suggests that earlier estimates based solely on CBAM benchmark values substantially underestimate the potential financial burden faced by South African firms. Nigeria (14th) and Egypt (17th) rank significantly lower in this sector.

In the category of **fabricated metal products**, which is downstream from basic metals, South Africa remains the most carbon intensive African producer but ranks much lower overall, at 13th position. Tunisia ranks 23rd, and Morocco 25th.

Table 3 Price of CBAM certificate by Countries

| Million of euro | Aluminium | Cement | Fertiliser | Iron_steel | Sum | Million of euro | Aluminium | Cement | Fertiliser | Iron_steel | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Algeria | 121.353 | 1601.535 | 36802.063 | 19578.458 | 58103.409 | Guinea | 0 | 0 | 0 | 39.852 | 39.852 |
| Benin | 1.623 | 0.068 | 0 | 52.63 | 54.321 | Liberia | 14.915 | 0 | 0 | 44.161 | 59.076 |
| Burkina Faso | 2.856 | 0 | 0 | 63.589 | 66.445 | Libya | 0 | 0 | 4088.693 | 38504.249 | 42592.942 |
| Côte d'Ivoire | 22.651 | 0.003 | 0 | 582.355 | 605.009 | Mauritania | 1.135 | 0 | 0 | 148.321 | 149.456 |
| Cameroon | 47183.335 | 0.006 | 0.003 | 129.676 | 47313.02 | Sierra Leone | 709.78 | 0 | 0 | 370.897 | 1080.677 |
| Congo | 0.968 | 0 | 0 | 10.049 | 11.017 | Rwanda | 0.556 | 0 | 0.147 | 0.921 | 1.624 |
| DR. Congo | 1.53 | 0 | 0 | 4.948 | 6.478 | Zambia | 0 | 0 | 0.104 | 757.75 | 757.854 |
| Egypt | 324780.13 | 623.986 | 40254.224 | 42451.292 | 408109.629 | Djibouti | 3.117 | 0 | 0.031 | 29.325 | 32.473 |
| Gabon | 0 | 0 | 0 | 1129.458 | 1129.458 | Kenya | 152.791 | 0 | 0.009 | 33.348 | 186.148 |
| Ghana | 56969.433 | 0.116 | 0 | 55.612 | 57025.161 | Uganda | 0 | 0 | 0 | 5.192 | 5.192 |
| Madagascar | 41.867 | 0 | 0 | 44.429 | 86.296 | Mozambique | 665071.43 | 0 | 0 | 736.636 | 665808.07 |
| Malawi | 0 | 0 | 0 | 0.976 | 0.976 | Ethiopia | 282.378 | 0 | 0 | 10.418 | 292.796 |
| Mali | 5.355 | 0 | 0 | 2.449 | 7.804 | Seychelles | 7.65 | 0 | 0 | 6.953 | 14.603 |
| Morocco | 38661.694 | 304.813 | 26260.259 | 12932.343 | 78159.109 | Niger | 0.456 | 0 | 0 | 498.275 | 498.731 |
| Nigeria | 2579.19 | 0.014 | 3298.245 | 113.391 | 5990.84 | Chad | 1.349 | 0 | 0 | 2.251 | 3.6 |
| Senegal | 33.29 | 0.008 | 0.431 | 653.056 | 686.785 | Equatorial Guinea | 0 | 0 | 0 | 10.068 | 10.068 |
| South Africa | 518495.98 | 5.209 | 224.301 | 301111.608 | 819837.095 | Burundi | 0 | 0 | 0 | 0.177 | 0.177 |
| Sudan | 0.31 | 0 | 0.003 | 3.449 | 3.762 | South Sudan | 0 | 0 | 0 | 1.164 | 1.164 |
| Togo | 1.548 | 0 | 0 | 2.984 | 4.532 | Sao Tome and Princip | 5.617 | 0 | 0 | 0.123 | 5.74 |
| Tunisia | 15934.071 | 857.068 | 2069.393 | 46269.169 | 65129.701 | Eswatini | 22.729 | 0 | 0 | 1.655 | 24.384 |
| Tanzania | 900.632 | 0 | 0 | 99.14 | 999.772 | Botswana | 0.002 | 0 | 0 | 22.441 | 22.443 |
| Mauritius | 4025.585 | 0.002 | 0.963 | 157.231 | 4183.781 | Comoros | 0 | 0 | 0 | 0.205 | 0.205 |
| Namibia | 30.163 | 0 | 1.983 | 167.315 | 199.461 | Central African Rep. | 0 | 0 | 0 | 1.411 | 1.411 |
| Zimbabwe | 11.948 | 0 | 0 | 29245.931 | 29257.879 | Gambia | 0 | 0 | 0 | 0.297 | 0.297 |
| Angola | 3117.304 | 0.016 | 0 | 197.237 | 3314.557 | Guinea-Bissau | 0 | 0 | 0 | 0.007 | 0.007 |
| Cabo Verde | 3.358 | 0.002 | 0 | 2.895 | 6.255 | Somalia | 1.616 | 0 | 0 | 0.405 | 2.021 |
| Eritrea | 0 | 0 | 0 | 45.2 | 45.2 | Total | 1679202 | 3392.846 | 113000.9 | 496333.4 | 2291928.8 |

Finally, in the **electricity** and **gas sector**, which includes hydrogen-related exports, only three African countries appear in the ranking: Morocco (8th), Senegal (16th), and Côte d'Ivoire (23rd).

For the most affected countries, a dual strategy should be pursued. First, they should move toward greater domestic value addition by transforming CBAM-covered products into more downstream goods. This would reduce exposure to CBAM while simultaneously advancing structural transformation. Second, they should reorient part of their exports toward alternative markets. More broadly, all African countries should proactively identify alternative uses and markets for goods that may be affected by future extensions of CBAM.

## 5 Identifying alternative trade direction

Two major developments currently underway provide grounds for cautious optimism regarding Africa's industrialisation prospects and its potential to reposition within global value chains. These are China's removal of tariffs on almost all African imports and the establishment of the African Continental Free Trade Area.

Given China's position as the world's second most populous country, one of the fastest-growing consumer markets, the largest global manufacturing hub, and a major importer of primary commodities, it's policy shift creates new opportunities for African exporters to access a vast and expanding market on preferential terms. Beyond traditional raw material exports, tariff elimination could function as an Asian counterpart to AGOA, insofar as it opens market opportunities for African firms to move into higher value-added activities aligned with China's evolving domestic demand. These include agro-processing, green minerals, intermediate industrial inputs, and light manufacturing.

However, African countries must avoid reproducing with China the same asymmetric trade relationship that has characterised their engagement with Western economies, including with the United States under AGOA. Although the Chinese government has eliminated tariffs on most African imports, it has simultaneously expanded the use of non-tariff barriers, increasingly aligning its regulatory approach with that of advanced economies. This mirrors the Western model of trade policies, where tariff reduction is accompanied by the proliferation of regulatory constraints and trade barriers.

Table 6 in Appendix III illustrates this trend by presenting the evolution in the number of Sanitary and Phytosanitary (SBS) and Technical Barriers to Trade (TBT) measures introduced annually across six key markets, namely the EU, the United States, China, India, Morocco, and Egypt. By 2025, the number of active SPS and TBT measures in China exceeds that of the EU. While this indicator does not capture the relative stringency of individual measures, it offers a useful proxy for assessing the overall direction of Chinese regulatory strategy, particularly when compared with India or major African economies.

Moreover, Chinese trade relations are often embedded within broader political conditionalities. These include, among others, the non-recognition of Taiwan and the protection of strategic Chinese interests, notably through initiatives such as the Belt and Road Initiative. The only African countries that were not granted zero-tariff access were the members of the Southern African Customs Union (Botswana, Eswatini, Lesotho, Namibia, South Africa) due to Eswatini's diplomatic recognition of Taiwan (South China Morning Post, 2025).

Through active industrial policy and targeted investment in productive capacity, this preferential access can be leveraged to attract both Chinese and African manufacturers. Those manufacturers could rely on Africa's relative neutrality in global affairs and its position in the blind spot of major trade policies to use African countries as a platform for manufacturing aimed at wider access to European, African and Chinese markets. Such a diversification strategy would help African producers reduce their structural dependence on European markets.

Developing economies generally impose lighter regulatory burdens, which makes it easier for exporters from countries with comparable levels of development to access these markets. The lower compliance costs reduce entry barriers and create more immediate commercial opportunities. Developing countries do not yet have the same level of regulation and are therefore easier to export to for countries with similar levels of development. Figure 4 shows the level of regulation by level of development and by region.

Structural similarities among countries in the Global South undergoing industrialisation create favourable conditions for knowledge diffusion and technology transfer. Comparable production structures, consumer preferences, market constraints and institutional challenges facilitate learning processes and the adaptation of technologies among firms operating at similar stages of development. These shared characteristics reduce coordination costs and increase the effectiveness of South-South cooperation in building productive capabilities.

Most countries exhibiting the lowest levels of non-tariff barriers are located in Africa. However, this pattern is not uniform across the continent. Several East African countries, including Uganda, Tanzania and Kenya, have developed relatively extensive Sanitary and Phytosanitary measures and Technical Barriers to Trade. Latin American countries have also implemented a large number of non-tariff barriers. Beyond these cases, countries with comparatively low regulatory intensity are predominantly found in Africa and parts of Asia, particularly the Pacific region. This configuration suggests that African countries could exploit relatively low regulatory frictions to expand trade with these partners.

In this context, African countries should actively leverage the opportunities created by the African Continental Free Trade Area. The establishment of the AfCFTA represents a historic attempt to create a unified continental market. By reducing intra-African tariffs and progressively harmonising regulatory frameworks, the agreement aims to overcome market fragmentation and foster the development of regional supply chains. A larger and more integrated market enhances the scope for economies of scale, improves investment attractiveness and enables firms to specialise within regional production networks. More importantly, the AfCFTA provides African policymakers with an institutional platform to coordinate industrial policies across borders, thereby promoting regional value chains that can support deeper, more resilient and more inclusive industrialisation trajectories.

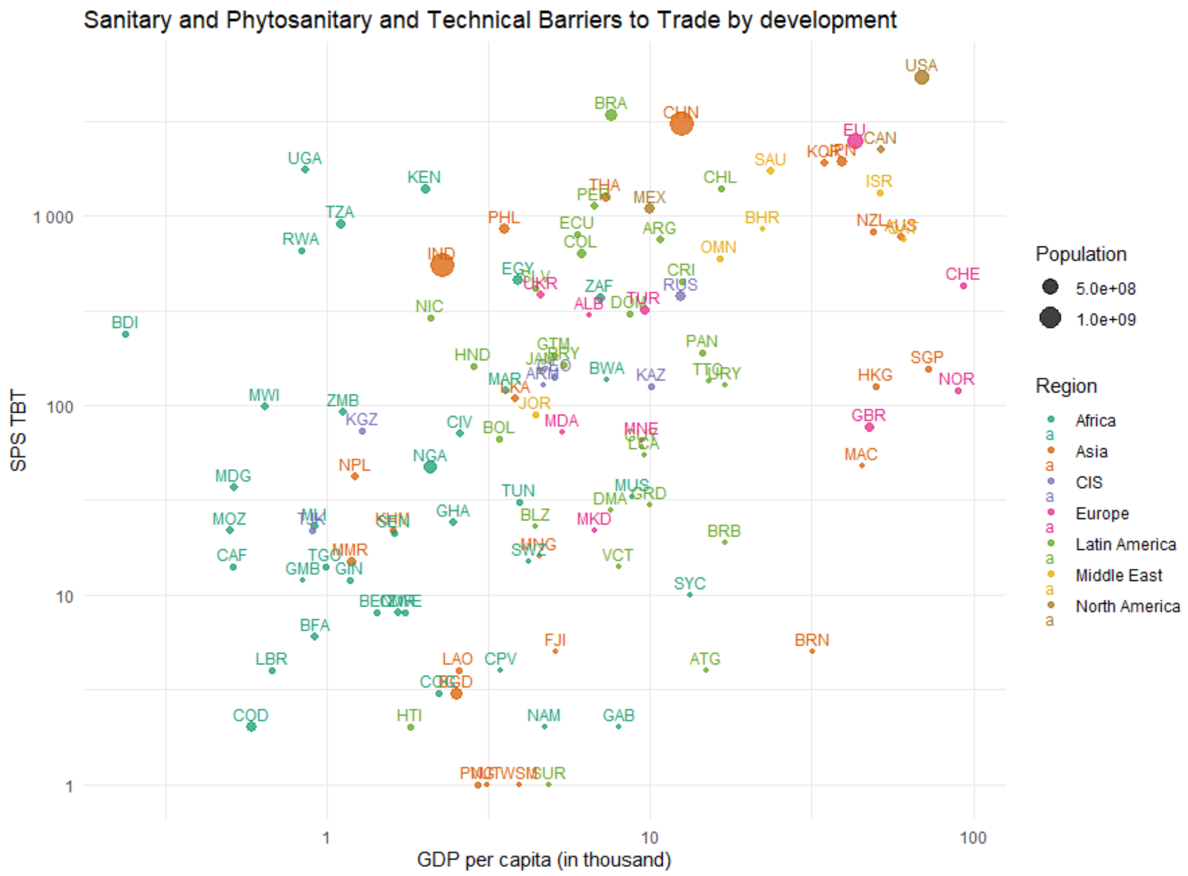

Figure 4 SPS and TBT by GDP level and region

Together, these two developments expand both the external opportunities (preferential access to China) and the internal foundations (a larger unified market) needed for Africa to pursue a more autonomous and capability-driven industrial strategy.

Western markets are largely saturated, with mature consumer bases and slower demand growth, which limits the expansion potential for new entrants compared to the dynamic markets of developing economies. Exporting to Western economies requires compliance with stringent norms and regulatory frameworks that function as non-tariff barriers for newcomers. These include sanitary and phytosanitary standards, technical barriers to trade and intellectual property requirements.

## 6. Conclusion

This paper has examined the implications of the CBAM for African economies, with a particular focus on carbon-intensive sectors and the scope for trade reorientation beyond the EU market. The analysis provides new evidence on both the magnitude of CBAM-related costs and the feasibility of alternative export destinations for African producers.

The results confirm that CBAM is likely to impose substantial and uneven costs across African countries and sectors. Aluminium and iron and steel emerge as the most exposed industries, driven by large gaps between EU ETS benchmarks and the carbon intensity of African production systems, as well as by the upstream structure of value chains. For major exporters such as South Africa, Egypt, and Mozambique, reliance on benchmark default values understates the true exposure once supply-chain emissions are taken into account. These findings underscore that CBAM is not merely a border tax but a mechanism that reshapes incentives along entire production networks.

Several developing and emerging economies, particularly in Africa and Asia, appear as plausible alternative destinations due to lower regulatory entry costs and growing demand. However, as exemplified by the UK, regulatory convergence through the introduction of CBAM-like instruments is expected in the following years, both to tackle climate change and to preserve access to the European market.

However, the implications of the preceding discussion warrant caution. Many of the countries importing CBAM-covered goods do so as part of European-centred supply chains. In such cases, imports are not fully autonomous and may instead be subject to supply chain reconfiguration and prefer more CBAM-compliant inputs. On the other hand, where inputs are fungible and domestic regulations are not aligned with the EU ETS and CBAM, exporting countries may adopt a dual-track strategy. They could continue to source or produce non-CBAM-compliant goods for domestic consumption and non-EU markets, while allocating CBAM-compliant production specifically to exports destined for the EU.

Additionally, an export strategy centred on CBAM-compliant products may be difficult to implement in sectors dominated by foreign-owned firms. In such cases, strategic decisions are taken by parent companies rather than host countries, and firms may ultimately choose to relocate production away from more carbon-intensive locations.

From a policy perspective, the results point to a dual strategy. In the short run, African countries can mitigate CBAM exposure by diversifying export destinations toward markets with lower regulatory barriers and by deepening South-South trade. In the medium to long run, however, reorientation alone is insufficient. Structural transformation through greater domestic value addition and the development of downstream industries is essential to reduce vulnerability to carbon-based trade measures. In this regard, the African Continental Free Trade Area plays a central role by expanding market size, lowering intra-African trade costs, and providing an institutional framework for coordinated industrial policy.

More broadly, the findings highlight that CBAM risks reinforcing existing asymmetries in global trade governance unless accompanied by meaningful support for decarbonisation and capability building in developing countries. Without such measures, CBAM may function less as a climate instrument and more as a de facto non-tariff barrier. For African policymakers, the challenge is therefore not only to adapt to CBAM, but to leverage the current reconfiguration of trade and climate policy to pursue a more autonomous, resilient, and regionally embedded development path.

However, the success of any African strategy of trade redirection ultimately depends on African policymakers. They must articulate a coherent strategy, either toward greater domestic value addition or toward reorienting exports to more trade-friendly partner countries. To support domestic firms in this transition, African governments may need to provide export-promotion services. These include marketing activities to match domestic sellers with foreign buyers, provision of information on foreign markets, exporter-importer matching mechanisms, and international campaigns to enhance the country's commercial image. Such policies would help African countries reduce their long-term reliance on a narrow set of export markets.

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## Appendix 1 Matching products of different disaggregation level

The CBAM DV are provided using a mix of 4-, 6-, and 8-digit CN classifications. The CN (Combined Nomenclature) classification corresponds to the HS22 (Harmonized System 2022) up to the 6-digit level, to which two additional digits are added by the EU Customs Regulation to reach 8 digits. We match these classifications at the 6-digit level with the CEPII BACI database.

- **4-digit CN products** correspond to 4-digit HS codes. Their estimated emission intensities are attributed to the corresponding 6-digit HS codes.
- **6-digit CN products** correspond to 6-digit HS codes and are matched directly on a one-to-one basis to the corresponding 6-digit HS codes.
- **8-digit CN products** that all share the same estimated emission intensity are aggregated directly into a single 6-digit HS code.
- **8-digit CN products** that do **not** share the same estimated emission intensity present an aggregation issue. In such cases, we compute the arithmetic mean of the different estimated emission intensities and assign this average to the corresponding 6-digit HS code.

Using this procedure, we obtain a 6-digit HS code for each CBAM-related product, each associated with its corresponding estimated emission intensity.Using the official CBAM product list, we extract the corresponding 2-digit and 4-digit product codes to match them with the relevant ETS manufacturing categories.

A methodological issue arises because certain products can be manufactured through multiple production routes. In such cases, where several ETS benchmark processes may apply to a single good, we calculate the average of the corresponding ETS benchmark carbon intensities to represent the product’s emission factor.

## Appendix 2 Additional tables

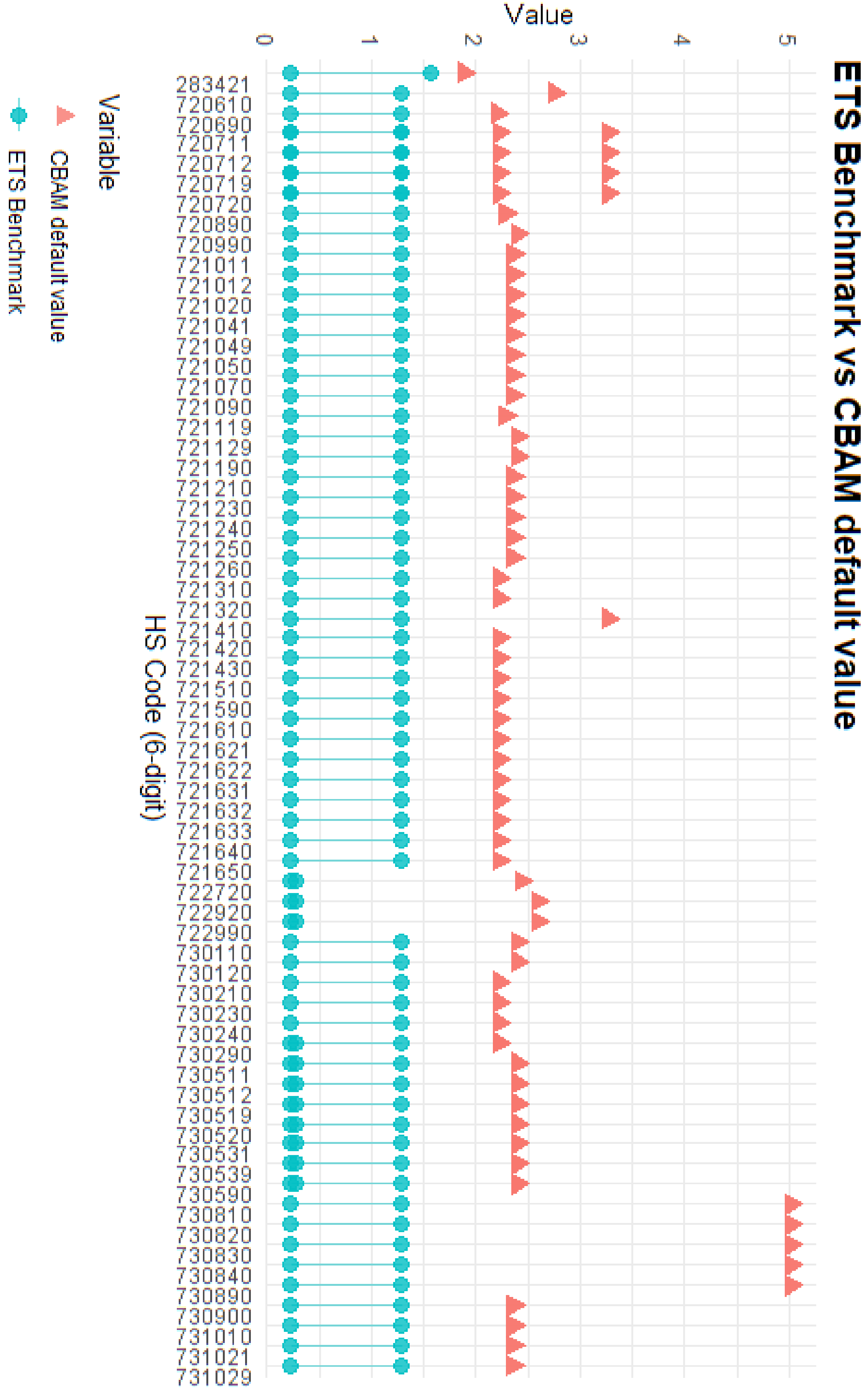
*Table 4 List of countries considered in the ICIO*

| ISO3 | Country | ISO3 | Country | ISO3 | Country | ISO3 | Country |
|---|---|---|---|---|---|---|---|
| ARG | Argentina | CRI | Costa Rica | LAO | Laos | SEN | Senegal |
| AUS | Australia | EGY | Egypt | MAR | Morocco | SGP | Singapore |
| BGD | Bangladesh | GBR | United Kingdom | MEX | Mexico | THA | Thailand |
| BLR | Belarus | HKG | Hong Kong | MMR | Myanmar | TUN | Tunisia |
| BRA | Brazil | IDN | Indonesia | MYS | Malaysia | TUR | Turkey |
| BRN | Brunei | IND | India | NGA | Nigeria | TWN | Taiwan |
| CAN | Canada | ISR | Israel | NZL | New Zealand | UKR | Ukraine |
| CHL | Chile | JOR | Jordan | PAK | Pakistan | USA | United States |
| CHN | China | JPN | Japan | PER | Peru | VNM | Vietnam |
| CIV | Côte d'Ivoire | KAZ | Kazakhstan | PHL | Philippines | ZAF | South Africa |
| CMR | Cameroon | KHM | Cambodia | RUS | Russia | | |
| COL | Colombia | KOR | South Korea | SAU | Saudi Arabia | | |

Table 5 List of industry categories covered by the ETS

| **Iron and steel** | **Cement** | **Fertilizers** | **Aluminium** | **Hydrogen** |
|---|---|---|---|---|
| **CBAM covered goods** | | | | |
| Coke (27) | Grey cement clinker (38) | Nitric acid | Pre-bake anode | Hydrogen |
| Sintered ore (26) | White cement clinker (76) | Adipic acid | [Primary] Aluminium | Synthesis gas |
| Hot metal (72) | Lime | Ammonia | | |
| EAF carbon steel (72) | Dolime | | | |
| EAF high alloy steel (72) | Sintered dolime | | | |
| Iron casting (73) | | | | |
| **Non-CBAM covered goods** | | | | |
| Float glass | Bottles and jars of colourless | Bottles and jars of coloured glass | Continuous filament glass fibre | Facing bricks |
| Pavers | Roof tiles | Spray dried powder | Mineral wool | Plaster |
| Dried secondary gypsum | Plasterboard | Short fibre kraft pulp | Long fibre kraft pulp | Sulphite pulp, thermo-mechanical |
| Recovered paper pulp | Newsprint | Uncoated fine paper | Coated fine paper | Tissue |
| Testliner and fluting | Uncoated carton board | Coated carton board | Carbon black | Steam cracking |
| Aromatics | Styrene | Phenol/ acetone | Ethylenoxid / Ethylenglykol | Vinylchlorid-Monomer (VCM) |
| S-PVC | E-PVC | Soda ash | Heat Benchmark | Fuel Benchmark |

## Appendix 3 Additional figures


ETS Benchmark vs CBAM default value
Value
0
1
2
3
4
5
HS Code (6-digit)
283421
720610
720690
720711
720712
720719
720720
720890
720990
721011
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Variable
CBAM default value
ETS Benchmark

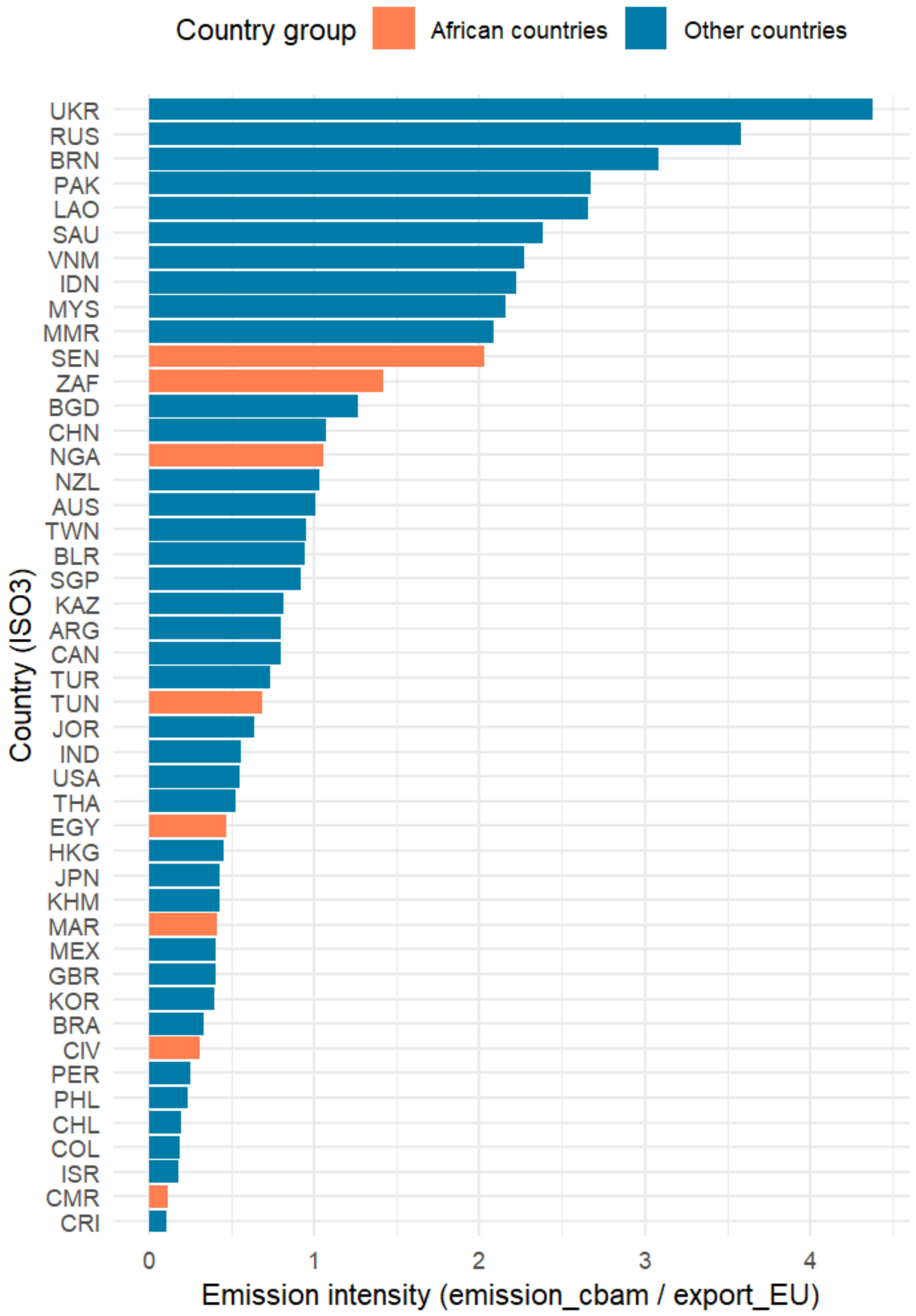

*Figure 5 CBAM emission intensity ranking C20 contains Fertiliser*

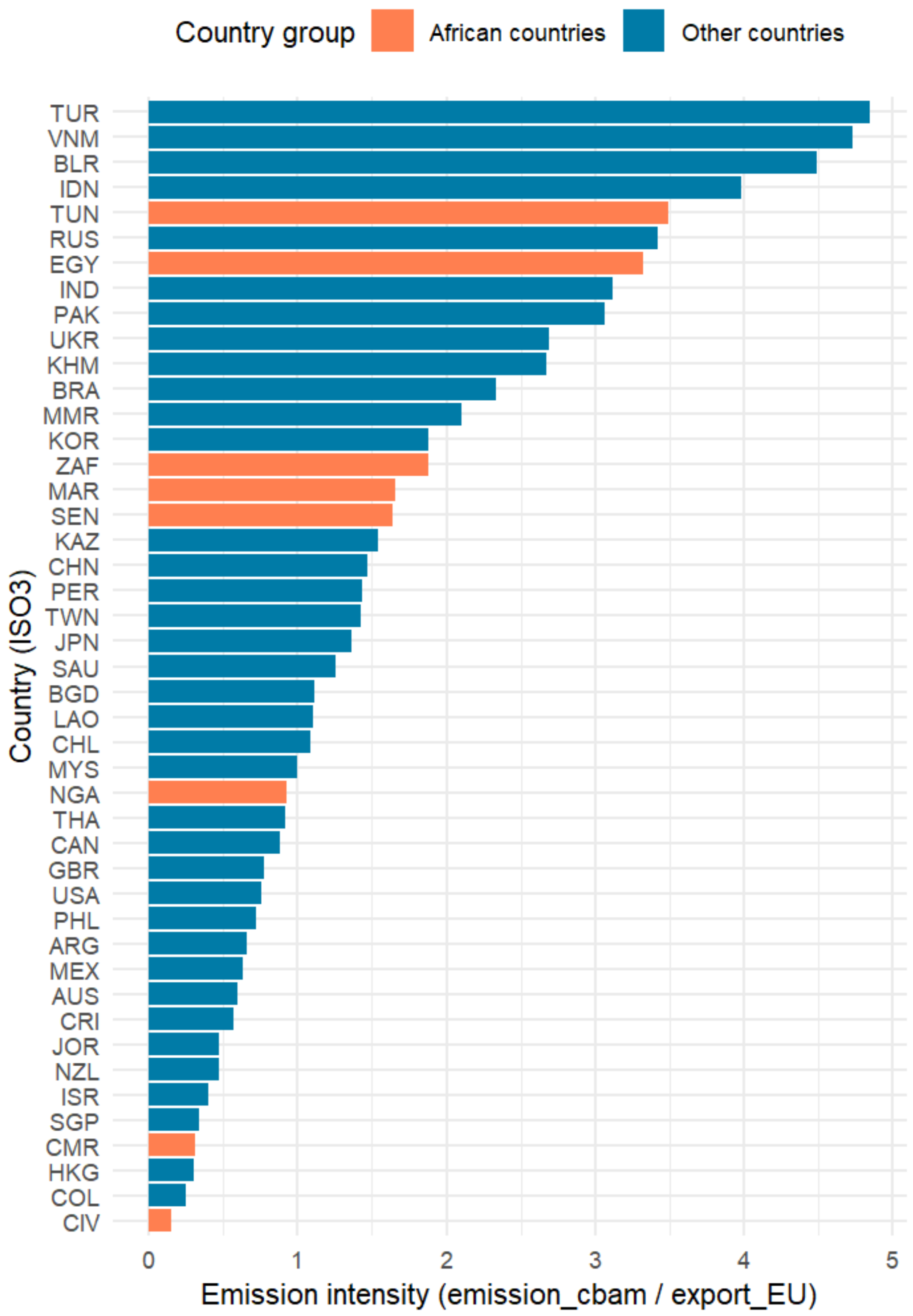

*Figure 6 CBAM emission intensity ranking C23 contains Cement*

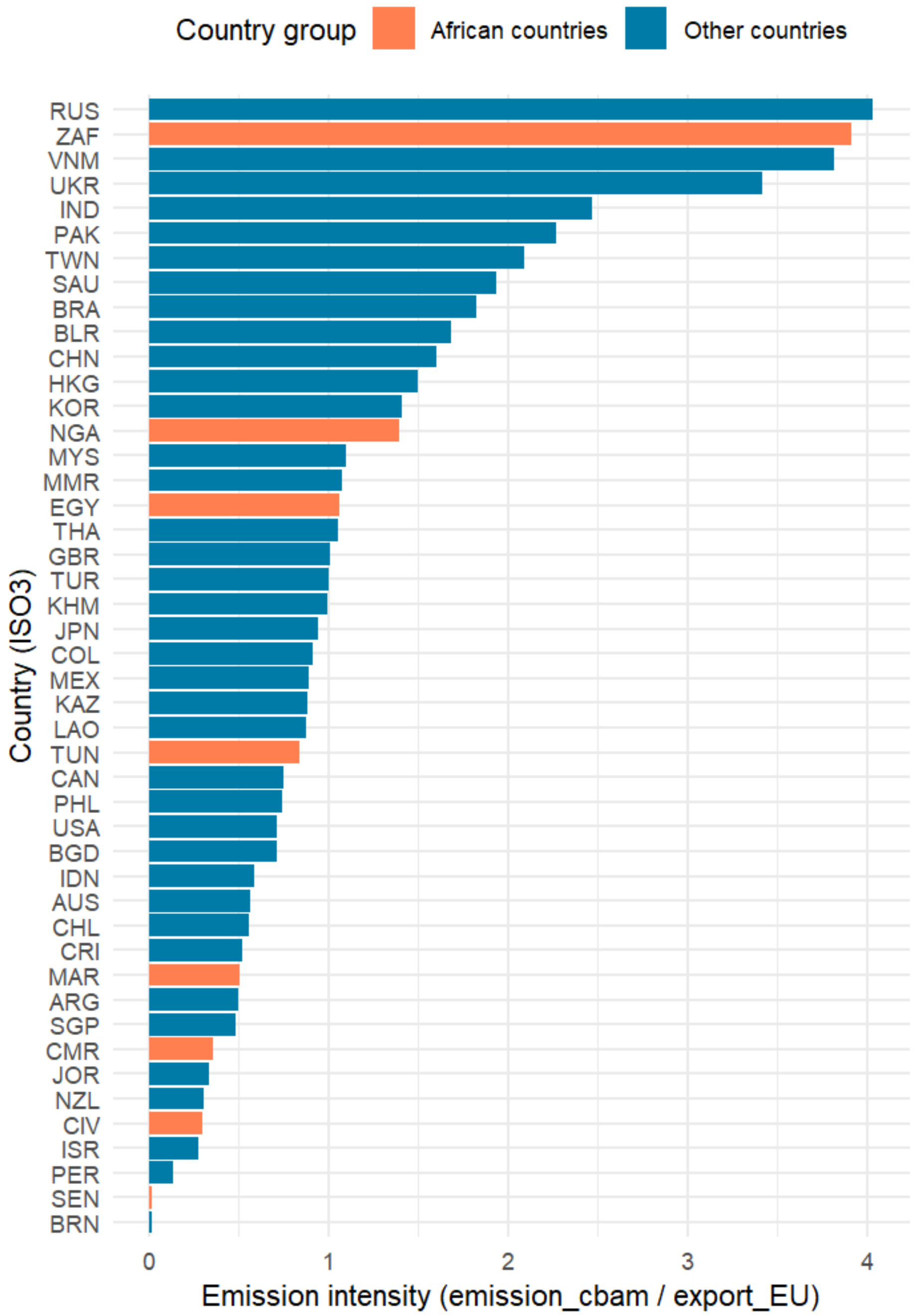

*Figure 7 CBAM emission intensity ranking C24 contains aluminium and steel*

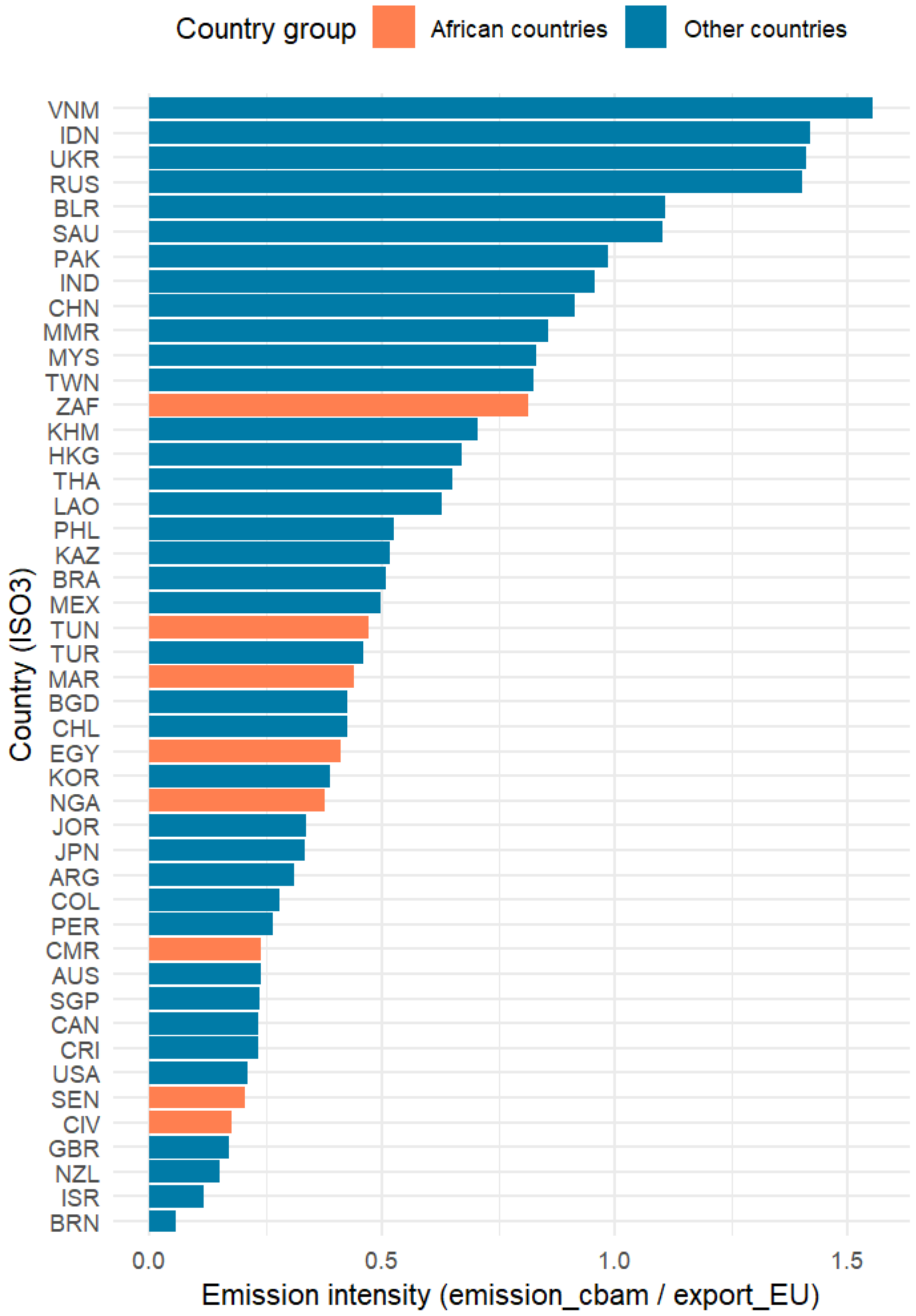

*Figure 8 CBAM emission intensity ranking C25 contains Aluminium and Steel (transformed)*

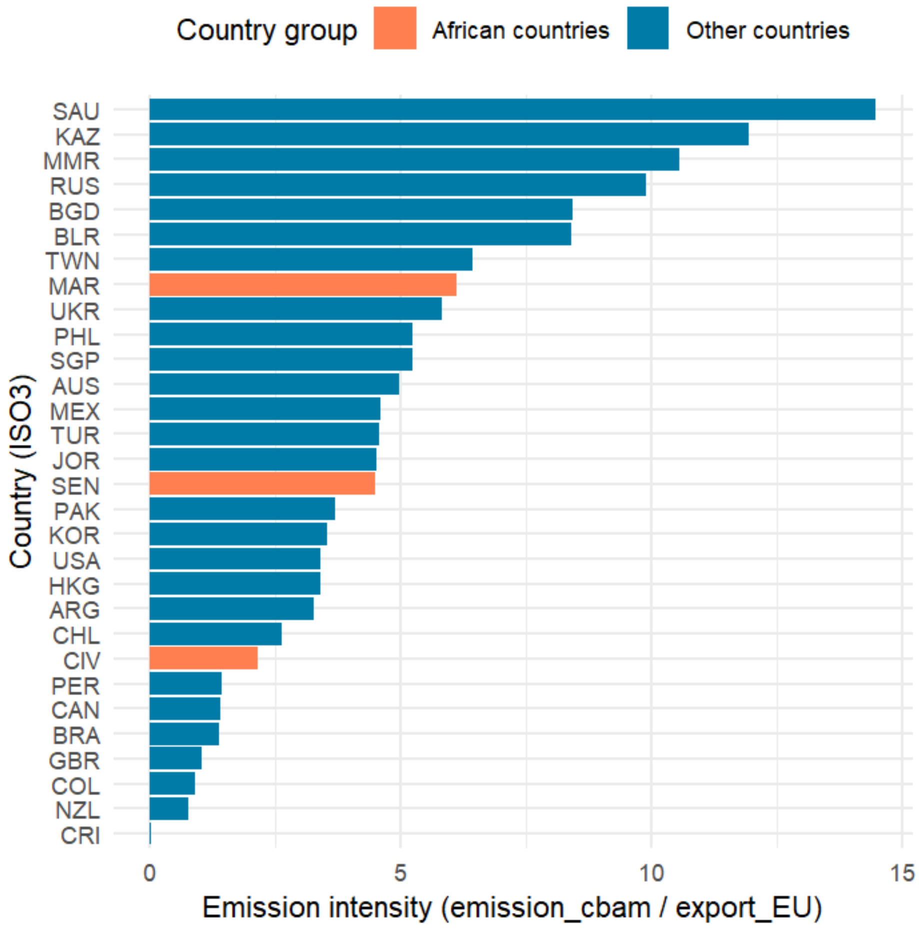

*Figure 9 CBAM emission intensity ranking D contains electricity and Gas*

*Table 6 Number of SPS and TBT measures installed since 1995*

<table>
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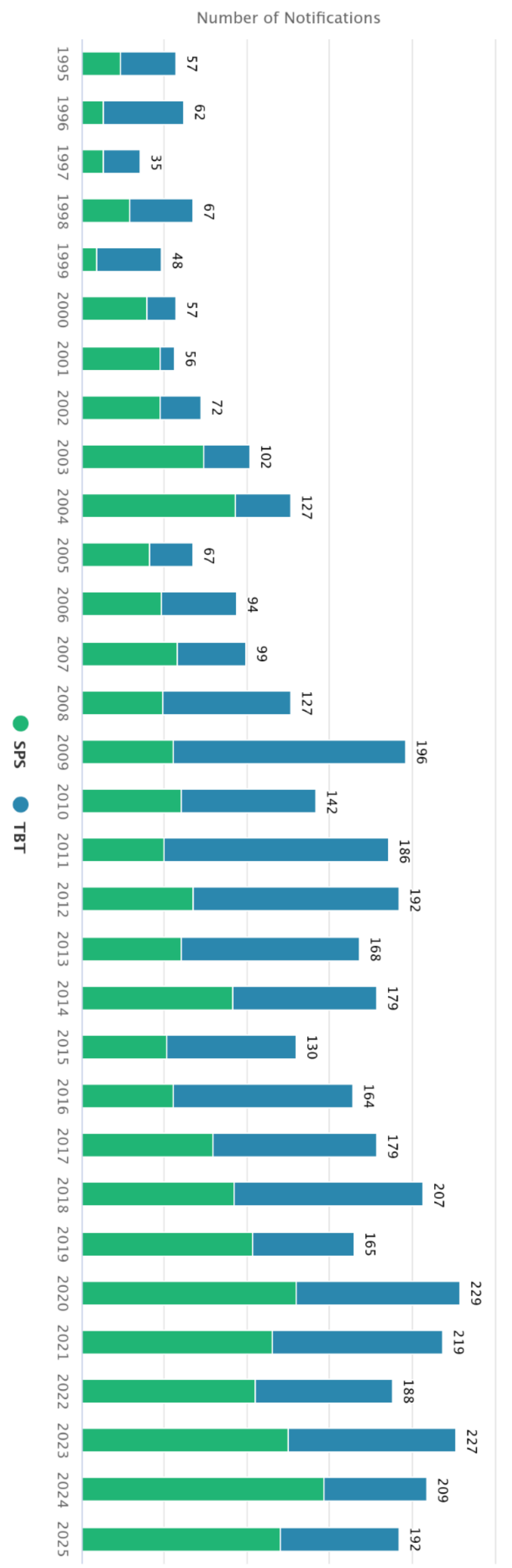

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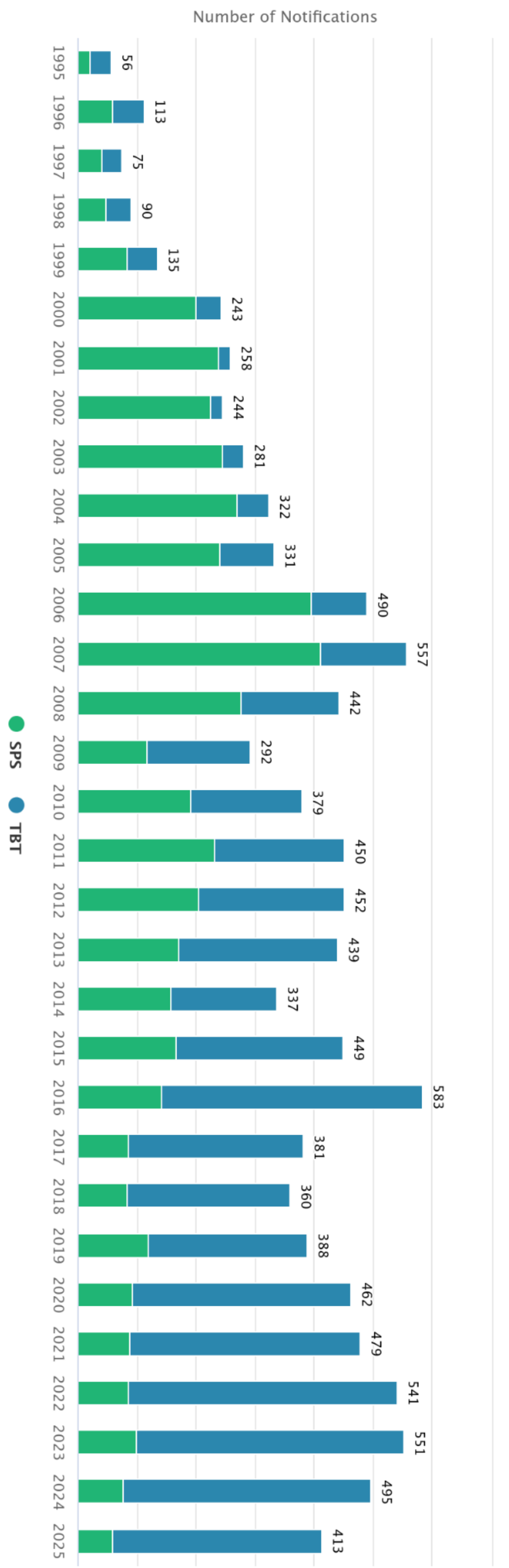

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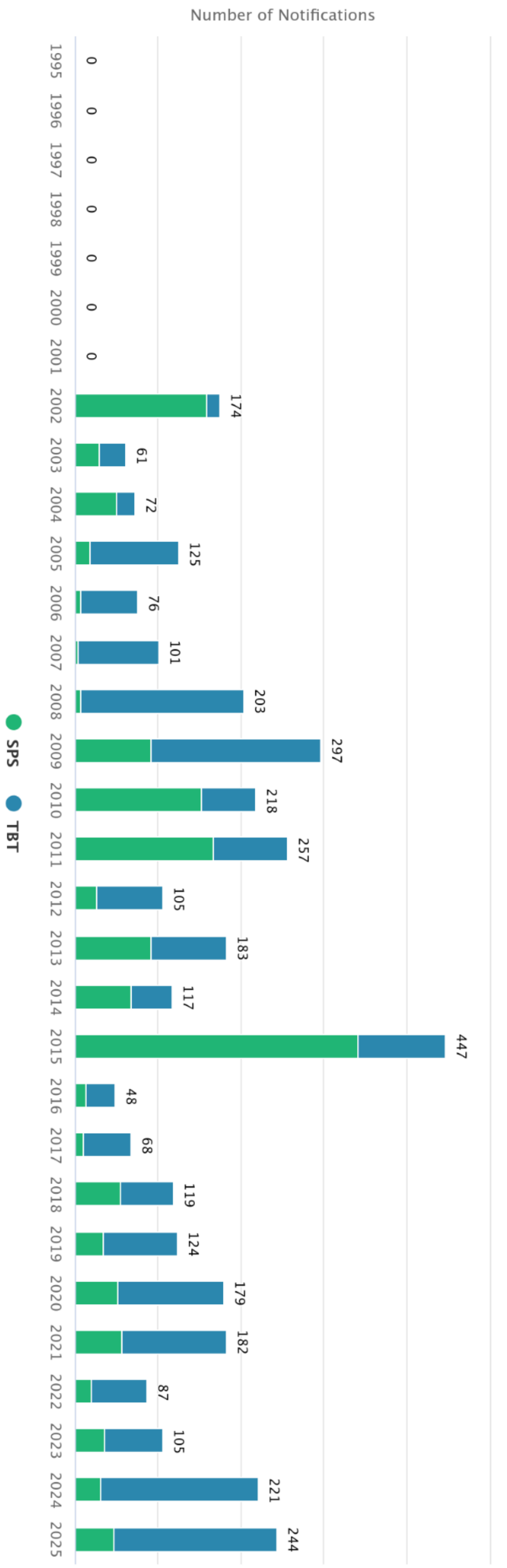
China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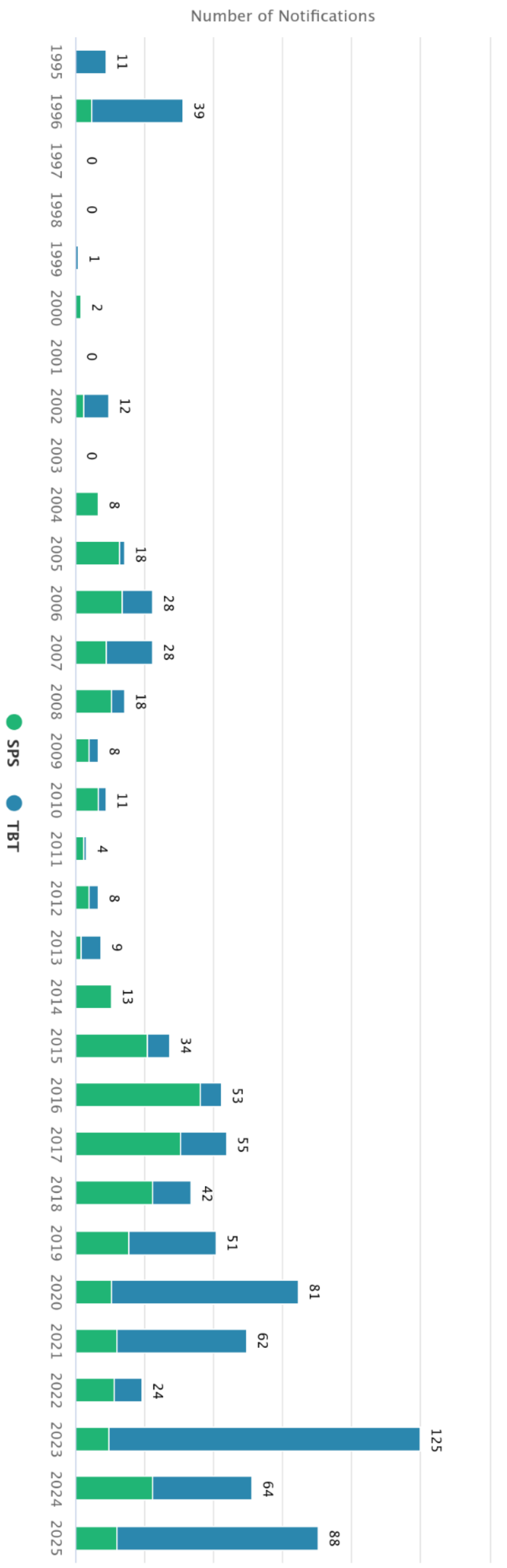
India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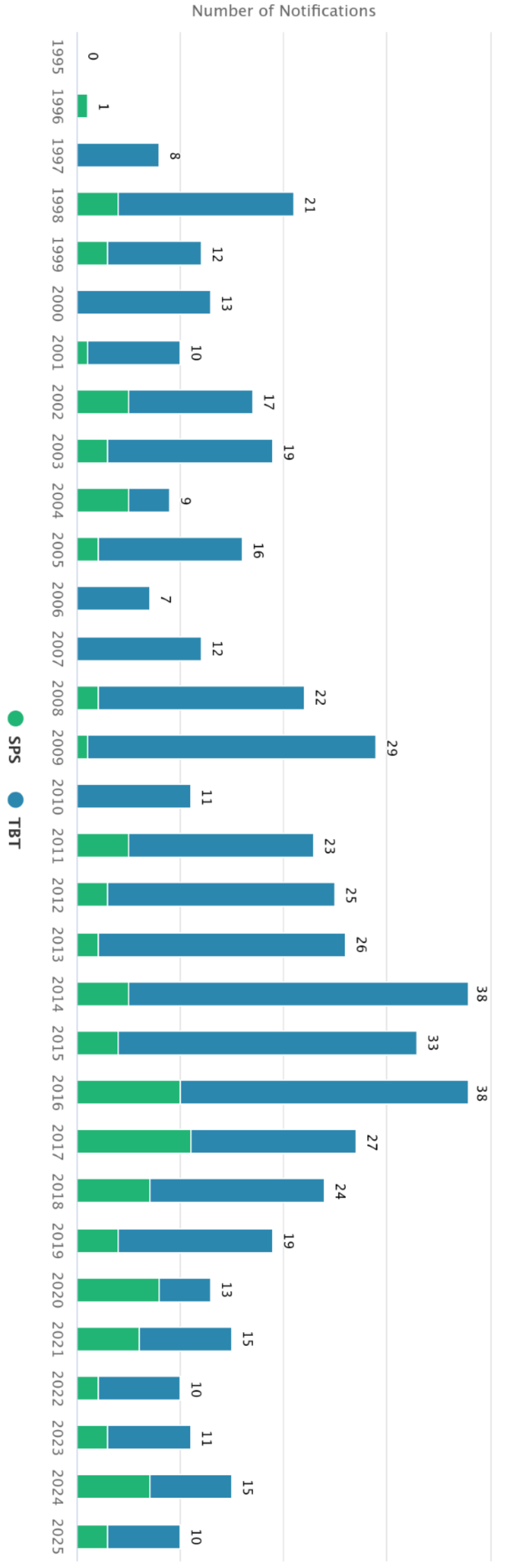
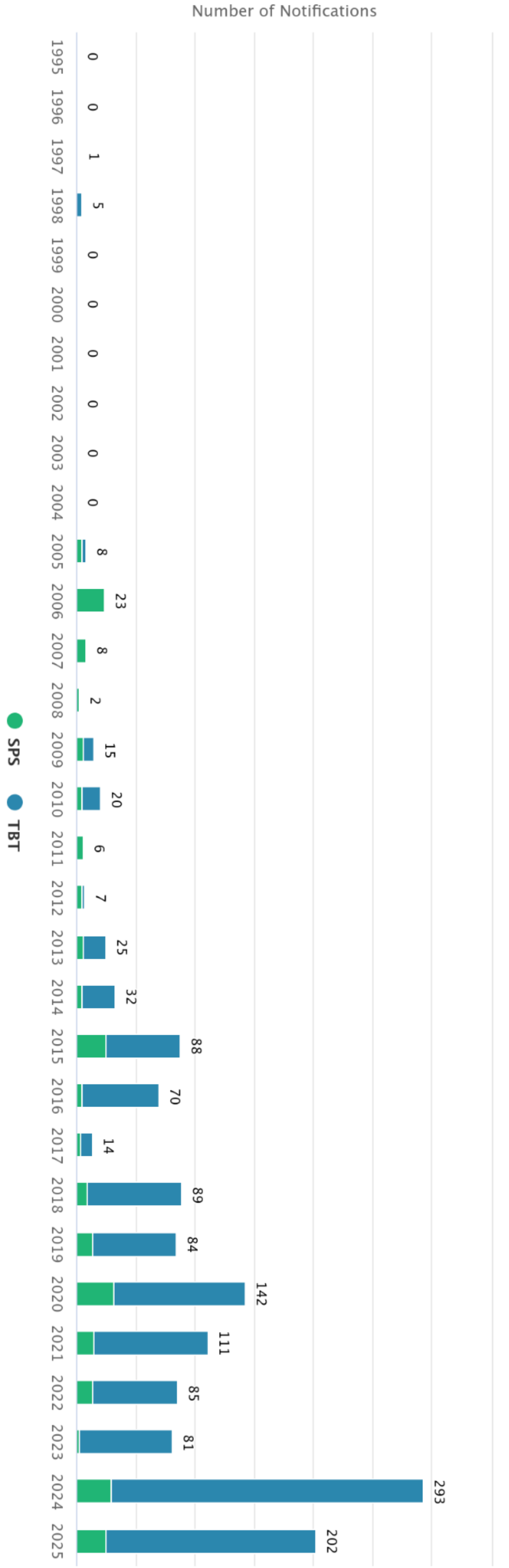
**South Africa**



**Egypt**



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