# CBAM AND TÜRKİYE: SECTORAL INTERACTIONS, COSTS AND BENEFITS

**About SHURA Energy Transition Center**

SHURA Energy Transition Center, founded by the European Climate Foundation (ECF), Agora Energiewende, and Istanbul Policy Center (IPC) at Sabancı University, contributes to the decarbonisation of the energy sector via an innovative energy transition platform. It caters to the need for a sustainable and broadly recognized platform for discussions on technological, economic, and policy aspects of Türkiye's energy sector. SHURA supports the debate on the transition to a low-carbon energy system through energy efficiency and renewable energy by using fact-based analysis and the best available data. Taking into account all relevant perspectives by a multitude of stakeholders, it contributes to an enhanced understanding of the economic potential, technical feasibility, and the relevant policy tools for this transition.

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**Design**

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This report and the assumptions made within the scope of the study have been drafted based on different scenarios and market conditions as of end 2023. Since these assumptions, scenarios, and the market conditions are subject to change, it is not warranted that the forecasts in this report will be the same as the actual figures. The institutions and the persons who have contributed to the preparation of this report cannot be held responsible for any commercial gains or losses that may arise from the divergence between the forecasts in the report and the actual values.

# CBAM AND TÜRKİYE: SECTORAL INTERACTIONS, COSTS AND BENEFITS

# Key Messages

- **Even in the absence of carbon pricing, the total cost of Turkish exports in CBAM sectors exceeds the total benefits.** This highlights the urgent need for a robust structural transformation in these sectors. Such a transformation should not be limited to individual industries but should holistically incorporate intersectoral linkages, trade policies, and sustainable development strategies.

- **Structural transformation should extend beyond production processes and be framed through the lenses of the green transition and energy transition.** Decarbonization roadmaps must be designed with multiple alternative scenarios, considering the internal dynamics of each sector. The overall net-zero carbon roadmap should align with Türkiye's development priorities and integrate emissions reduction strategies together with circular economy principles.

- **The timing of the transformation is critical, with a strategic focus on the 2035–2040 period.** Given international competition and the increasing adoption of CBAM policies in both the EU and other regions, early adaptation is essential for Türkiye to maintain its competitiveness.

- **Carbon pricing and the implementation of a national Emissions Trading System (ETS) could strengthen Türkiye's position in the EU market.** While carbon pricing would help mitigate the burden of border carbon taxes, utilizing domestic carbon tax revenues to finance the transition would provide a significant financial resource.

- **International cooperation and financing opportunities must be leveraged to support industrial transformation.** Climate diplomacy and collaboration with other exporting countries affected by CBAM will play a significant role in ensuring a fair distribution of costs.

# Key Findings

- Under the business-as-usual scenario (BAU), without a carbon border tax in place, the economic costs arising from Türkiye's export of all CBAM products to all countries (World) namely, the international trade deficit, decline in value added in forward linkage industries, and transport-related costs—exceed the benefits, i.e., export value added, international trade surplus, and increase in value added in backward linkage industries. This situation also applies to Türkiye's exports of CBAM products specifically to the EU at the current EU ETS price levels (approximately EUR 70/ton).

- Under the Transformation scenario, the industrial transformation is centred on a production composition that facilitates the green transition and increases unit value added, thereby reducing Türkiye's export volume of CBAM products accordingly. In this scenario, the benefits of exports, i.e., export value added, increase in value added in forward linkage industries, and international trade surplus, outweigh the costs, i.e., international trade deficit, decline in value added in backward linkage industries, and transport-related costs, despite the carbon border tax. Additionally, the benefits of exporting CBAM products to the EU exceed the costs up to a carbon border price of EUR 230/ton.

- Assuming a carbon border tax of EUR 100/ton, the ratio of the difference between total benefits and total costs of Türkiye's CBAM exports to the World to overall GDP is of significant magnitude (approximately –0.2%), while the ratio is neutral for Türkiye's CBAM exports to the EU. In the Transformation Scenario, the negative impact of Türkiye's global CBAM exports relative to GDP is reduced to nearly zero and that of exports to the EU is positive (approximately 0.2%), with overall impacts in comparison to GDP being relatively small.

- Assuming a carbon border tax of EUR 100/ton, when the difference between the total benefits and total costs of Türkiye's CBAM exports is expressed as a proportion of sectoral value added, the BAU scenario reveals that the most limited impact is observed for global exports of the iron and steel sector (approximately –1.2%). In contrast, the negative effects of the cement (approximately –232%), aluminium (approximately –298%), and fertilizer (approximately –475%) sectors are considerably high. While the BAU scenario shows high net negative contributions for cement, aluminium, and fertilizer, the Transformation scenario indicates a positive contribution in all sectors globally, except for fertilizer.

# EXECUTIVE SUMMARY

## A. Introduction

As of 2024, ninety percent of the 195 countries that are parties to the Paris Agreement adopted emissions reduction targets, and 95 countries have declared a net-zero carbon commitment (World Bank Group, 2024). These 95 countries account for 85% of global energy-related emissions. Although governments have developed an extensive array of policies to combat climate change, significant implementation gaps remain. Developed economies are increasingly turning to industrial policy options that accelerate the green transition. In the United States, for example, under the Inflation Reduction Act (IRA), a "Private Sector Clean Energy Industrial Investment Plan" valued at USD 110 billion was announced. Similarly, the European Union supports the provision of affordable, reliable, and sustainable energy through the Net-Zero Industry Act. On the other hand, starting from early 2025, both the change in administration in the United States[1] and its withdrawal from the Paris agreement, and concerns over balancing the Green Deal with competitiveness in the EU[2] pose the risk of slowing down the process in the coming years. This report primarily relies on the prevailing dynamics as of 2024, operating under the assumption that, despite fluctuations and delays, the overall trajectory toward decarbonization will remain intact. While the quantitative figures presented in this report may differ over time, the key assessments regarding Türkiye's relevant industrial sectors are expected to remain valid.

## B. Emissions Reduction Policies and CBAM

The Carbon Border Adjustment Mechanism (CBAM) implemented by the EU is designed to apply carbon pricing to the importation of carbon-intensive goods so that both imported and domestic products are subject to the same carbon cost. This measure aims to prevent carbon leakage—i.e., where the production of carbon-intensive products is relocated abroad to avoid taxation. Additionally, by equalizing carbon taxes, this policy helps preserve the competitiveness of products produced within the EU relative to imported ones, while simultaneously reinforcing the expansion of renewable energy within the EU. Renewable energy generation is expected to overtake coal and become the world's largest source of electricity by early 2025 (IEA, 2024). Despite these developments, there remains a broad implementation gap in the EU's overall climate policy portfolio, including comprehensive carbon pricing, which is a critical component of the needed policy set.

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[1] At the beginning of 2025, U.S. President Donald Trump signed an executive order freezing all support payments under the Inflation Reduction Act (IRA). As of the end of 2024, USD 50 billion of the allocated USD 100 billion for the IRA had been committed, and USD 18 billion had been disbursed. The remaining USD 32 billion in payments has been halted. However, since the allocations are contractually bound, legal action remans an option (The Washington Post, 2025).

[2] By the end of February 2025, the European Commission is expected to propose a series of revisions to the Green Deal, referred to as the "omnibus package." While the full content has not yet been disclosed, it is anticipated that the revisions will include reducing corporate sustainability reporting obligations and easing the mandatory requirements in the EU taxonomy for sustainable activities. Independently of the Commission, there have also been calls in Germany and France to freeze these obligations for two years or longer. Additionally, discussions are underway to reduce reporting requirements under CBAM and to increase the minimum exemption threshold for imports. However, the proposed changes do not involve any modifications to the net-zero emissions targets or the fundamental structure of CBAM implementation (Environmental Resources Management, 2025; EU News, 2025).

Among the most important policy instruments supporting emissions reduction is carbon pricing/taxation. Carbon pricing policies are generally categorized into two main types: direct and indirect. Under direct policies, the carbon tax and Emissions Trading System (ETS) are the two main policy areas, while carbon credit markets intersect both policy areas. Indirect policies include measures such as the reduction of fossil fuel subsidies, fossil fuel taxes, and similar instruments. A decade ago, carbon pricing/tax policies covered 7% of total emissions; today, this share has increased to nearly 24%, with carbon revenues reaching USD 104 billion in 2023 (World Bank, 2024). Globally, 75 carbon pricing instruments are in place, comprising 39 carbon taxes and 36 ETS. In addition to numerous national measures, there are also sector-specific applications—such as those in air and maritime transport—at the global level.

In the context of decarbonization, carbon pricing is one of the critical medium- to long-term policy priorities for Türkiye. The implementation of CBAM is particularly important for preserving and enhancing trade with the EU, Türkiye's largest trading partner. However, beyond merely adapting to CBAM in order to safeguard EU trade, Türkiye, in light of its 2053 net-zero target, requires a comprehensive set of carbon pricing policies—one that extends beyond CBAM and other countries' practices to encompass its entire economy.

### C. Aim and Methodology of the Study

This study, titled "CBAM and Türkiye: Sectoral Interactions, Costs and Benefits," aims to reveal the quantitative and qualitative impacts of the EU's CBAM on Türkiye's economy. The analysis focuses on four sectors in Stage 1 (iron and steel, cement, aluminium, and fertilizer) and is based on a cost-benefit assessment.

Benefits and costs are determined within two main scenarios and their respective sub-scenarios. In the "Business-As-Usual" (BAU) scenario, it is assumed that existing industrial and trade policies will continue, with priority given to all potential export opportunities in the sectors considered. Under this scenario, no significant transformation in product composition—regarding value added, sustainability, and the green transition—is expected, and sector exports are projected to increase in line with historical trends. In the "Industrial Transformation" scenario, however, changes in industrial and trade policies are assumed. Significant alterations are assumed in production capacity, product composition, and export structures based on each sector's domestic demand, export value-added potential, sustainability, and green transition considerations. Accordingly, exports of CBAM products are assumed to deviate from historical trends, with their share in total production declining in the medium to long term. "Hypothetical" carbon costs, which reach very high levels when applied to both exports over the past twenty years and to future projections assuming the continuation of similar trends, are significantly reduced in the Industrial Transformation scenario.

In this context, it is possible to envisage a series of intermediate scenarios, such as a more limited decline in exports or the adoption of decarbonization technology options. Although more detailed analyses and subsequent discussions are warranted in this area, this study opts for a simplified presentation that compares the results of a simulation based on the continuation of current conditions with those based on a policy change paving the way for rapid decarbonization.[3]

Sector-specific impacts are expressed in terms of costs[4]—such as carbon emissions, international trade deficits, price increases, and elevated energy demand—associated with the production of exports, as well as benefits—such as exports' value added, international trade surpluses, price reductions, and decreased energy demand. Intersectoral effects are evaluated based on the costs and benefits arising in forward and backward linkage industries (i.e., changes in value added) and include impacts such as carbon emissions from transportation and fuel costs associated with these sectors. Calculating the costs imposed by CBAM based on the current export levels of these four sectors could involve using current carbon emissions quantities as a basis and projecting these calculations linearly into the future in proportion both to the overall size of the sectors and to GDP. While this approach appears reasonable, it is insufficient for accurately estimating medium- to long-term effects. **In Türkiye's case, it is important to consider each sector's transformation potential in terms of technology, business models, and market opportunities, and to adopt a Transformation scenario that goes beyond a mere continuation of the current situation.**[5] Under a linear growth scenario, a rapid increase in carbon pricing costs or in investment costs for decarbonization technologies to prevent the linear rise in emissions would ensue. In the Transformation scenario, reductions in production or production growth in carbon-intensive sectors are expected to be offset, owing to changes in production composition, by gains in value added both in the analysed sector and in forward linkage industries, thereby generating additional benefits from decarbonization.

Nevertheless, a simple comparison of carbon costs across different scenarios would be insufficient for a comprehensive impact assessment. As previously emphasized, while a complex impact analysis presents challenges, incorporating future indirect impacts that can be calculated—both from related sectors and from transportation—will facilitate more robust evaluations in the future. Therefore, this study considers not only direct impacts but also these indirect impacts to provide a more comprehensive outlook.

The impacts are addressed using a three-step approach. In the first step, "direct effects" are calculated from a broad perspective, including the additional costs imposed on the respective sectors by the carbon pricing/taxation under CBAM, as well as other costs and benefits generated by export volumes. In the second step, the effects of changes in export volumes on forward and backward linkage industries are again evaluated in terms of a cost-benefit differentiation. In the third step, the impacts arising from the transportation of export products are assessed. The effects in the second and third steps are referred to as "indirect impacts."

[3] In both scenarios, sectoral export projections take into account factors such as global competitiveness, the structure of the sectors, and domestic and international demand dynamics. However, as is the case for the current situation, the strong impact of policy choices represents another important dimension. In this regard, the study compares the outcomes of two options at different ends of the policy spectrum.

[4] If the current structure of industrial production and exports continues, the value added generated from exports is considered a benefit, while the current account deficit, price increases, and rises in energy demand associated with that structure are regarded as costs. On the other hand, if a transformation that raises the technology level and facilitates decarbonization occurs in the structure of industrial production and exports, then the reductions in the current account deficit, prices, and energy demand are viewed as benefits.

[5] See SHURA Energy Transition Center's Net Zero and Industrial Policy studies (SHURA, 2023; SHURA, 2024a).

In addition to the quantitative cost-benefit impacts, qualitative assessments have been conducted to cover other quantitative effects not calculated in this study, as well as elements not included in the methodology, such as impacts on GDP, employment, and regional effects.

**Table ES1.** Scope of quantitative impact analysis

| IMPACT ANALYSIS | |
|---|---|
| **First Step: Direct Impacts** | |
| **Costs** | Carbon Emissions |
| | International Trade Deficit |
| | Price Increases (CPI* Effect) |
| | Increase in Energy Demand |
| **Benefits** | Export Value Added (CBAM Sector) |
| | International Trade Surplus |
| | Price Decreases (CPI* Effect) |
| | Decrease in Energy Demand |
| **Second Step: Indirect Impacts – Forward and Backward Linkage Impacts** | |
| **Costs** | Decline in Value Added of Forward Linkage Industries |
| | Decline in Value Added of Backward Linkage Industries |
| **Benefits** | Increase in Value Added of Forward Linkage Industries |
| | Increase in Value Added of Backward Linkage Industries |
| **Third Step: Transportation Impacts**** | |
| **Costs** | Carbon Emissions from Transportation |
| | Cost of Fuel Used in Transportation |

**CPI: Consumer Price Index*

*** In this study, the focus is on the effects arising from transportation rather than on the impacts generated within the transportation sector itself; changes in export volumes that may affect the value added of the transportation sector are not considered.*

Datasets have been produced for the selected variables—aimed at quantifying the impacts of CBAM in terms of costs and benefits—using either the actual outcomes from the 2009–2023 period or calculations/historical estimates derived from those outcomes. These datasets help to understand the fundamental trends and dynamics during that period for each product group and sector in terms of exports, international trade balance, price movements, energy demand, forward-backward linkage effects, and transportation volumes, while also providing insights into intra-linkages.

In addition to the trends revealed by the 2009–2023 data,[6] projections have been prepared for the 2024–2050 period for each CBAM sector, taking into account future trends (e.g., technology levels, competitive conditions, market opportunities, etc.). In these sectoral projections, as previously emphasized, factors such as global competitiveness, sector structures, and domestic and international demand dynamics have been considered. However, rather than relying solely on forecasts based on these variables, the effects of changes in policy preferences—another powerful variable—are also taken into account. Consequently, scenarios representing the outcomes of these two contrasting policy choices are presented as a form of simulation. As with all projection studies covering extended periods, it is necessary to interpret the quantitative outcomes of this study on a relative and comparative basis.

## D. Scenarios

The study employs two primary scenarios: the Business-As-Usual (BAU) scenario and the Transformation scenario. In each scenario, different assumptions are made regarding variables such as export growth, export composition, the impact levels on forward and backward linkage sectors,[7] energy demand, and price changes.

- **Business-As-Usual (BAU) Scenario:** In this scenario, export growth for the period 2024–2050 is projected in line with past trends, with the expectation that existing structural dynamics will continue. It is also assumed that the composition of exports—that is, the mix of product groups—will follow a pattern similar to that of the past. As a result of these assumptions, positive effects are anticipated in backward linkage industries, while negative effects are expected in forward linkage industries.
- **Industrial Transformation (Transformation) Scenario:** In this scenario, for the period 2024–2050 an industrial transformation is envisaged that is based on a production composition designed to facilitate the green transition and enhance unit value added. This transformation scenario has been adapted from SHURA's studies "Net Zero 2053: Roadmap for the Turkish Electricity Sector" (SHURA, 2023) and "Industrial Policy Alternatives for Türkiye Within the Framework of a Just Transition" (SHURA, 2024). Under this scenario, especially in CBAM sectors, a shift toward a higher share of high value-added products in production capacity is envisaged, accompanied by a movement toward a more favourable international trade balance (i.e., a reduction in exports of low value-added products, with large export volumes and domestic production of high value-added products that are currently imported) as well as the development of sustainable products. Concurrently, it is assumed that the share of industries that use CBAM products as a primary input—such as high value-added machinery and equipment, electrical equipment, automotive, energy equipment, and construction-infrastructure sectors—will increase in overall production.

[6] For trade data (exports, imports, and the trade deficit), the ITC Trade Map and TÜİK Trade Statistics were used; for price changes (PPI, CPI, and sectoral PPI), TCMB data were employed; in addition to TÜİK's data on sectoral production and export volumes, data from sectoral organizations were also used; and for transportation data, datasets from the Ministry of Transport and Infrastructure along with expert assumptions were utilized.

[7] Forward linkage industries are defined as industries for which the studied sector provides inputs, while backward linkage industries are defined as industries that provide inputs to the sector studied. In order to measure the impacts on forward and backward linkage industries, the change in production in forward and backward linkage industries triggered by the change in the production of sector studied is calculated using input-output tables published by TÜİK.

- Within the main scenarios, the impacts have been disaggregated for Türkiye's total exports (global) and exports to the EU. The global scenarios are intended to simulate the effects that are not yet implemented outside the EU.
- The results presented below cover the period 2026–2050. The actual implementation date of CBAM has been used as the reference point, and free allowances have not been taken into account.[8]
- Four different carbon price assumptions have been used: EUR 0/ton, EUR 70/ton, EUR 100/ton, and EUR 120/ton, with EUR 100/ton serving as the primary assumption. The EUR 70/ton assumption reflects the current market price; however, it is anticipated that this price will converge to around EUR 100/ton in the near term. Given the length of the 2026–2050 period, the EUR 100/ton base price was selected as the main case, with expectations of fluctuation over this period. The EUR 0/ton scenario (i.e., the assumption that no carbon tax is applied) is intended to illustrate the cost-benefit outcomes under the continuation of current conditions, while the EUR 120/ton assumption reflects a situation whereby increases beyond current forecasts may occur.

## E. Impact Summary

When the calculated impacts are considered in terms of value, under the BAU scenario a carbon price/tax of EUR 100/ton leads to total costs exceeding total benefits for both global and EU trade. The four sectors under examination generate costs that are higher than the benefits derived from their exports under their current structures. Although the carbon pricing/tax assumption represents a significant cost component, it is notable that more than half of the total cost arises from other factors.

In the Transformation scenario, when a EUR 100/ton carbon tax is applied, slightly lower costs are observed for global trade, while a substantially higher benefit is generated for the EU. Both the reduction in carbon costs and increases in value added contribute to total benefits exceeding total costs. In the Transformation scenario, for global trade the highest contribution to total benefits comes from the iron and steel sector, followed by the aluminium and then the cement sector, whereas in the fertilizer sector, total costs exceed total benefits. For the EU, contributions are generated from all sectors, with the highest being iron and steel, followed by aluminium, cement, and fertilizer.

Considering the quantitative effects that were not calculated within this study, as well as other qualitative impacts, it is expected that under the Transformation scenario, the reduction of the current account deficit and the suppression of price fluctuations would yield further positive impacts on GDP. In addition, sectoral transformations are anticipated to stimulate employment growth and reduce gender- and geographically-based inequalities, thereby enhancing overall productivity.

[8] In the EU, in sectors subject to carbon taxation, a portion of production is exempt from carbon obligations, and in return, firms are granted "free allocation" certificates. It is on the EU's agenda to gradually reduce and eventually eliminate free allocations in the EU in the coming period (Statista, 2024).

Benefits and costs have been quantified in two ways: as absolute values and as rates of change. While changes in prices and energy demand are expressed as percentages, the other effects are expressed as monetary values (in EUR) and can thus be easily compared to each other in magnitude. As a result, although the impacts of the changes indicate indirect quantitative or qualitative outcomes, it is possible to derive the total cost and total benefit from these value estimates. For the period 2026–2050, total cost and total benefit have been calculated on a scenario-by-scenario basis with detailed assumptions for each scenario, enabling the quantification of the impact analysis.

A summary of the total costs and total benefits for the period 2026–2050, broken down by the two main scenarios, different carbon price assumptions, and for both global trade and EU trade, is presented below.[9]

**Table ES2.** Total benefits and costs in BAU and Transformation scenarios for the World and the EU under different carbon price assumptions

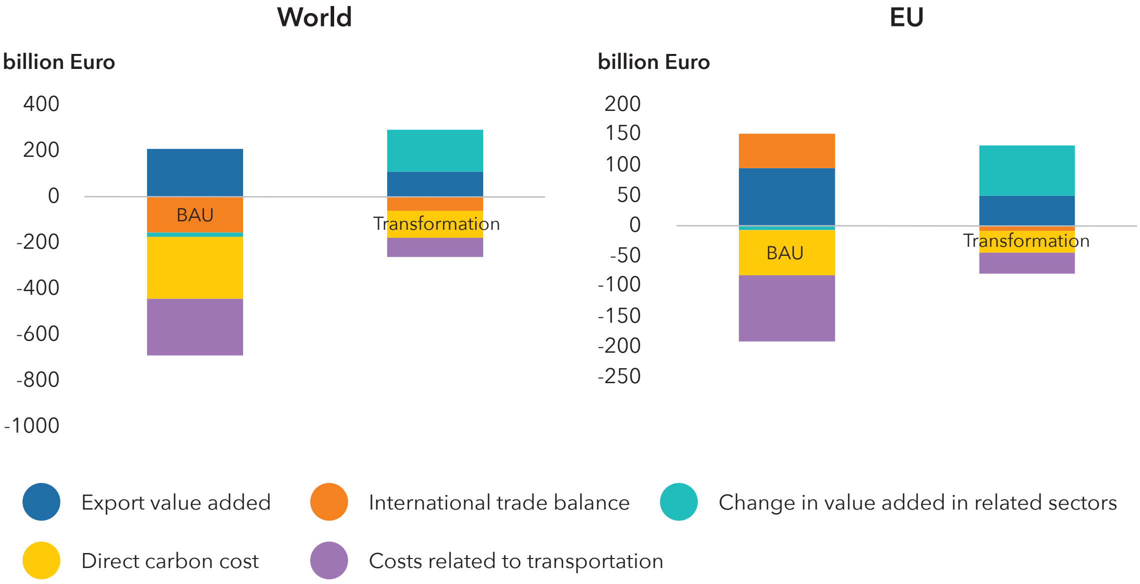
| 2026-2050 (million EUR) | World* | | EU | |
|---|---|---|---|---|
| | BAU | Transformation | BAU | Transformation |
| *Carbon Price: EUR 0/ton* | | | | |
| **TOTAL BENEFIT - TOTAL COST** | **- 161,645** | **196,019** | **46,766** | **100,577** |
| **TOTAL COST** | 442,455 | 172,921 | 159,038 | 52,956 |
| **TOTAL BENEFIT** | 280,811 | 368,939 | 205,804 | 146,895 |
| *Carbon Price: EUR 70/ton* | | | | |
| **TOTAL BENEFIT - TOTAL COST** | **- 417,834** | **83,078** | **- 9,375** | **68,864** |
| **TOTAL COST** | 698,644 | 270,715 | 215,180 | 78,031 |
| **TOTAL BENEFIT** | 280,811 | 353,793 | 205,804 | 146,895 |
| *Carbon Price: EUR 100/ton* | | | | |
| **TOTAL BENEFIT - TOTAL COST** | **- 527,629** | **37,210** | **-39,009** | **55,451** |
| **TOTAL COST** | 808,440 | 316,584 | 244,813 | 91,444 |
| **TOTAL BENEFIT** | 280,811 | 353,793 | 205,804 | 146,895 |
| *Carbon Price: EUR 120/ton* | | | | |
| **TOTAL BENEFIT - TOTAL COST** | **- 600,826** | **6,630** | **- 58,765** | **46,508** |
| **TOTAL COST** | 881,637 | 347,163 | 264,569 | 100,387 |
| **TOTAL BENEFIT** | 280,811 | 353,792 | 205,804 | 146,895 |

** World figures are calculated based on total trade, which also includes the EU.*

[9] The overall cost asymmetry between global trade and the EU is particularly notable in the BAU scenario. This situation arises from the limited share of cement exports to the EU. The cement sector represents a significant component of total costs due to both carbon emissions generated during production and the carbon emissions and fuel costs associated with transportation.

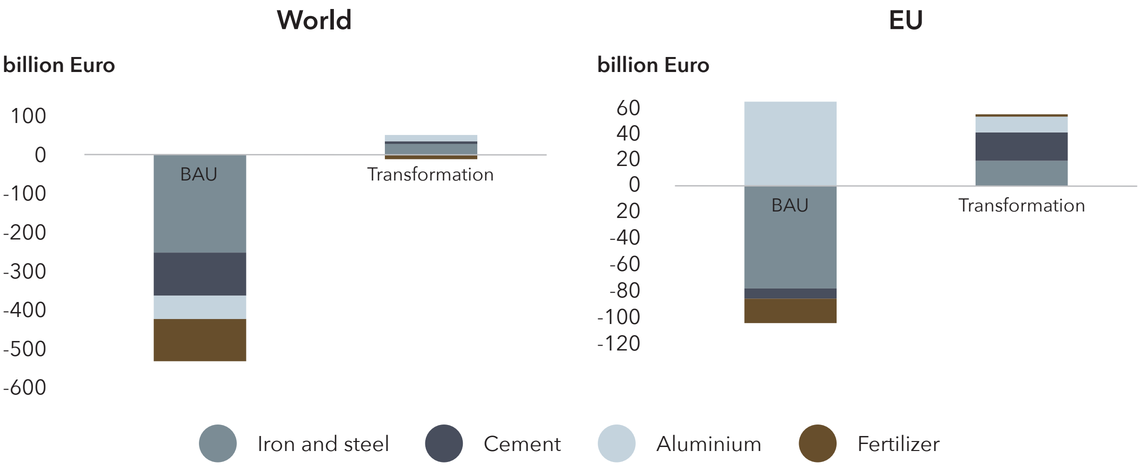
Figure ES1 represents a comparative diagram of the components (export value added, international trade balance, changes in value-added in linkage sectors, direct carbon costs, transportation-related costs, etc.) constituting the net benefit (total benefit minus total cost) in the BAU and Transformation scenarios. The sectoral distribution of net benefits is shown in Figure ES2.

**Figure ES1.** Comparative magnitude of the components constituting the net benefit in BAU and transformation scenarios (2026–2050)




*World figures are calculated based on total trade, which also includes the EU.*
*** A carbon price of EUR 100/ton is assumed.*

**Figure ES2.** Sectoral distribution of net benefits (2026-2050)




*World figures are calculated based on total trade, which also includes the EU.*
*** A carbon price of EUR 100/ton is assumed.*

When total net benefits (total benefits – total costs) are compared to long-term GDP, the BAU scenario shows a clearly negative impact on exports to the whole world (approximately –0.2%), while the impact on the EU is neutral. In the Transformation scenario, the negative effect on world exports approaches zero (approximately –0.1%), and the contribution for the EU is positive (approximately +0.2%), with the overall effects remaining relatively low compared to GDP. In the BAU scenario, when the net benefits are expressed as a ratio relative to sectoral value added, the most limited impact is observed in the iron and steel sector, while the effects in the cement, aluminium, and fertilizer sectors are considerably higher. In the BAU scenarios, the cement, aluminium, and fertilizer sectors exhibit high net negative contributions; however, in the Transformation scenarios, positive contributions are observed in all sectors for the world except for the fertilizer sector.

### Results and Conclusions

The key findings of the quantitative analysis indicated by Table ES2, Figure ES1, and Figure ES2 are summarized below:

- **World-BAU:** Considering Türkiye's total exports, in the initial BAU scenario, the total costs exceed total benefits for all carbon price assumptions. Even in the scenario with a carbon price of EUR 0/ton, which can be viewed as a continuation of the current situation or as a case in which no carbon pricing/tax is applied, the total costs (arising from factors such as the international trade deficit, fuel costs, and the loss of value added in forward linkage industries) exceed the total benefits. In the CBAM sectors, under current conditions, the total cost of exports is higher than the total benefit. Even with a carbon price of zero, the high costs relative to benefits in the World-BAU scenario are driven by the international trade deficit generated by imports and high transportation costs. Since these costs outweigh the export-generated value added and the increase in value added in domestic input-supplying (backward linkage) sectors, the overall economic benefit is negative.

- **World-Transformation:** In the Transformation scenario, under all carbon price assumptions, total benefits exceed total costs for exports to the world as a whole. The break-even point, where total costs equal total benefits, occurs at around EUR 124/ton. Should Türkiye's major trading partners, especially the UK and the United States, apply carbon pricing/taxes and the prices average around EUR 120/ton, additional measures beyond the Transformation scenario would be necessary.

- **EU-BAU:** For EU trade within the context of CBAM, except in the case of EUR 0/ton (i.e., no carbon tax applied), under all carbon price assumptions, total costs exceed total benefits. Once again, factors such as the international trade deficit, fuel costs, and the loss of value added in forward linkage industries determine the high total costs.

- **EU-Transformation:** In the Transformation scenario for EU trade, under all carbon price assumptions, total benefits exceed total costs. The break-even point, where total benefits equal total costs, is reached at around EUR 230/ton. Although a EUR 230/ton break-even point appears high, it is anticipated that such a high average long-term carbon price is unlikely. Therefore, when considering the EU CBAM context, it is advisable to focus on measures that support the assumptions in the Transformation scenario, particularly during the period up to and around 2035. While the EUR 230/ton break-even point may seem high, it is important to emphasize that given the concrete implementation of the EU CBAM and the significant transformation process that all competitors are expected to undergo in terms of compliance, the next ten years for Türkiye are critical for implementing industrial, trade, and decarbonization measures aimed at reducing economic costs and increasing production efficiency.

Calculating the full effects of the total benefit and total cost variables, along with the impacts of other quantitative outcomes on GDP, entails several challenges. In addition, while it is not possible to fully quantify a range of socioeconomic impacts, such as those on employment, gender equality, and regional effects, within the model, some qualitative conclusions regarding the direction of these effects can be drawn:

- Under the Transformation scenario, it is anticipated that significant developments—such as a reduction in the current account deficit, the suppression of price changes, reduced volatility of the Turkish Lira, and growth in medium- to high-value-added sectors—will generate a net positive contribution. Conversely, the BAU scenario is expected to yield an even greater net negative contribution than that calculated.

- Although the difference between total benefits and total costs is negative in the BAU scenario, it should be noted there are employment and socioeconomic benefits that are not measured in the above calculations. However, when considering the four examined sectors and the forward and backward linkage industries, the Transformation scenario is expected to generate additional employment compared to the BAU scenario, and this additional employment is likely to be composed of higher-paying, “good” jobs, resulting in a stronger overall socioeconomic impact. As these “good” jobs are created, a concurrent transformation in the relevant fields is anticipated, which may also lead to an increase in female employment.[10] Expanding employment while diversifying sectors also implies a broader geography in which employment can be found, thereby contributing to the reduction of regional inequalities. In this context, ensuring that the opportunities generated by the Transformation scenario are supported by appropriate policies to secure a just transition should be a key focus of policymaking (SHURA 2024).

- In the BAU scenario, the full extent of the negative impacts on forward linkage industries is not captured. It should be recognized that the current structure not only suppresses the value added of these sectors but also reduces total production volume, production capacity,

[10] It is assumed that an expansion in sectors where female employment is relatively high will also increase total female employment. However, considering the barriers that impede female employment, it should be emphasized that additional policies are necessary to advance gender equality. If strategies for developing green sectors are established from the outset with a specific focus and target on the principles of equal opportunity and non-discrimination, there is significant potential to comprehensively address gender inequalities and eliminate occupational and sectoral discrimination.

technology levels, and competitiveness. The negative impacts seen in the BAU scenario are much greater than the production and value-added decline observed in backward linkage industries (and the associated employment decline) in the Transformation scenario. It can also be highlighted that under the Transformation scenario, the higher value-added growth potential of the main sectors has the capacity to boost the value added of backward linkage industries, thereby offsetting some of the negative effects.

**Table ES3.** Qualitative results[11]

| Qualitative Outcomes | | |
|---|---|---|
| | **BAU** | **Transformation** |
| **Additional GDP contribution** | ↓↓ | ↑↑ |
| Current account balance | ↓↓ | ↑↑ |
| Price movements | ↑↑ | ↓↓ |
| Turkish Lira volatility | ↑↑ | ↓↓ |
| Share of medium- to high-technology sectors | ↓↓ | ↑↑ |
| **Employment** | | |
| Employment growth | ↑ | ↑↑ |
| Female employment | → | ↑↑ |
| Skilled employment | ↑ | ↑↑ |
| Wage levels | → | ↑ |
| **Other** | | |
| Regional inequality | ↓ | ↑ |

It is possible to expand the cost-benefit components selected in the study to include social, environmental, and other economic variables. However, the applied model is deemed sufficient to reveal the most important economic effects. In this context, arguably, the most important finding of this study is that even in the absence of carbon pricing/taxation, the total cost of exports in CBAM sectors under the current conditions exceeds their total benefit.

It is important to avoid interpreting the results at face value without considering complex aspects related to implementation. Such an approach could overlook some qualitatively significant positive effects when considering the economy as a whole. Poorly designed policies implemented solely on the basis of this impact analysis may lead to additional short-term problems. For example, measures that focus exclusively on restricting exports in any sector could result in destructive consequences, such as employment losses and firm shrinkage. Therefore, it is imperative that the high costs identified in the BAU scenario be addressed through a robust structural transformation. Moreover, rather than simply maintaining current conditions

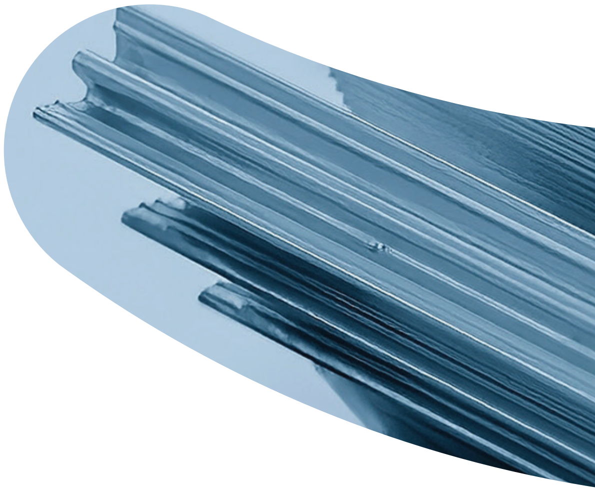
[11] Negative or decrease impacts are shown with downward-facing arrows; positive or increase impacts are shown with upward-facing arrows; neutral or constant impacts are shown with horizontal arrows. The number of arrows indicate the strength of the impact.

and growth trends, priority should be given to sectors and products that not only increase value added but also reduce carbon intensity, thus enhancing Türkiye's competitiveness and facilitating deeper integration into international value chains. By doing so, the need for high-cost investments such as hydrogen or carbon capture in the CBAM sectors—and indeed in all sectors that face challenges in decarbonization—can be significantly reduced. In addition, a more fundamental approach would be to implement emissions reduction strategies alongside circular economy practices, thereby enhancing resource and process efficiency and effectively reducing emissions.

**About Istanbul Policy Center at Sabancı University**
Istanbul Policy Center (IPC) is a global policy research institution that specializes in key social and political issues ranging from democratization to climate change, transatlantic relations to conflict resolution and mediation. IPC organizes and conducts its research under three main clusters: The Istanbul Policy Center–Sabancı University–Stiftung Mercator Initiative, Democratization and Institutional Reform, and Conflict Resolution and Mediation. Since 2001, IPC has provided decision makers, opinion leaders, and other major stakeholders with objective analyses and innovative policy recommendations.

**About European Climate Foundation**
The European Climate Foundation (ECF) was established as a major philanthropic initiative to help Europe foster the development of a low-carbon society and play an even stronger international leadership role to mitigate climate change. The ECF seeks to address the "how" of the low-carbon transition in a non-ideological manner. In collaboration with its partners, the ECF contributes to the debate by highlighting key path dependencies and the implications of different options in this transition.

**About Agora Energiewende**
Agora Energiewende develops evidence-based and politically viable strategies for ensuring the success of the clean energy transition in Germany, Europe and the rest of the world. As a think tank and policy laboratory, Agora aims to share knowledge with stakeholders in the worlds of politics, business and academia while enabling a productive exchange of ideas. As a non-profit foundation primarily financed through philanthropic donations, Agora is not beholden to narrow corporate or political interests, but rather to its commitment to confronting climate change.



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