

# CBAM's effects on Ukraine's economy & its decarbonisation efforts

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## Executive Summary

The European Union's Carbon Border Adjustment Mechanism (CBAM) will begin its paid phase in early 2026. Using assumptions to reflect the current economic situation of Ukraine in our model, we analyse its effects on Ukraine's economy and decarbonisation efforts. Our results suggest that, under its current design, CBAM will lead to output declines of emission-intensive sectors, such as steel and fossil-based power generation. However, the mechanism is unlikely to significantly harm Ukraine's overall economy. Only if the European Union (EU) extends CBAM to include Scope 2 emissions (i.e. indirect emissions from electricity consumption) for key sectors such as aluminium, iron, and steel - a possibility currently reviewed - Ukraine could face more substantial economic disadvantages. Whilst this is a good message for Ukraine's war-torn economy on the one hand, it also implies that CBAM in its present form is unlikely to drive meaningful decarbonisation in Ukraine. Given that meeting environmental and climate objectives is a core part of the EU accession process, insufficient progress in these areas could hinder Ukraine's integration into the European Union. To address this risk, we recommend developing a Decarbonisation and Transformation Fund that can actively support Ukraine's sustainable recovery, climate goals, and the modernisation of sectors such as steel.

## List of Abbreviations

**CBAM:** Carbon Border Adjustment Mechanism

**GHG:** Greenhouse Gas

**GTAP-CE:** Global Trade Analysis Project Circular Economy

**ETS:** Emission Trading System

**EU:** European Union

**LEDS:** Low-Emissions Development Strategy

**WTO:** World Trade Organisation

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## 1. CBAM and Ukraine's Economic Transition: Challenges, Opportunities, and Policy Choices<sup>2</sup>

The European Union (EU) has made significant strides in reaching its ambitious climate goals, to achieve climate neutrality by 2050 and reduce greenhouse gas (GHG) emissions by 55% compared to 1990 levels by 2030 (European Union, 2020). Central to this effort has been the introduction of a carbon price through the EU Emission Trading System (ETS), which has contributed to a 47% reduction in emissions since its launch in 2005 (Bektas, 2024). However, challenges remain, particularly concerning the external dimensions of EU climate policy.

One critical concern is the risk of "carbon leakage", where EU-based producers relocate carbon-intensive operations to countries with weaker climate regulations. By "offshoring" emissions, they undermine the EU's efforts to reduce global emissions. Additionally, higher carbon costs could lead to competitive disadvantages for EU producers against companies that shifted their operations outside the EU.

To address these challenges, a Carbon Border Adjustment Mechanism (CBAM) has been under development since the adoption of the European Green Deal in 2019, and was introduced by the EU as part of the 2023 regulatory framework (EUR-Lex, 2023). CBAM imposes a carbon-adjusted fee on commodities exported to the EU based on their emission footprint at the EU ETS price level. This approach aims to ensure fair competition and reduce the risk of carbon leakage as described. The mechanism has already entered its transitional phase, with reporting obligations imposed on importers in 2024.

CBAM's effect is expected to vary depending on the climate policies of each trade partner. Countries with robust carbon pricing schemes aligned with the EU ETS are likely to face minimal impacts. In contrast, jurisdictions with high emission intensity, weaker climate policies and strong exposure to the EU import market may see reduced export competitiveness and redirected trade flows.

Despite this, CBAM regulations offer provisions for exemptions, if the country complies with a set of requirements. For the power sector, or, in specific cases such as the war-context in Ukraine, a country may also enjoy special treatment in the application of CBAM. However, the latest Energy Community Secretariat's assessment (Energy Community, 2024) demonstrates that Ukraine does not meet all the criteria for granting the exemption. This is due to Ukraine not having proceeded with the market coupling requirement or the requirement for the roadmap to achieve climate neutrality by 2050 and introduction of the domestic ETS by 2030 (ibid.). Thus, unless substantial advancements are made or the

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force majeure clause is activated for Ukraine, the CBAM mechanism is expected to take its full effect in 2026. As the country's pre-war economy relied heavily on emission-intensive exports, this presents both challenges and opportunities for Ukraine.

There were previous attempts to model the potential implications of CBAM for selected sectors (e.g. the power sector) of the Energy Community Member Countries. The REKK study from 2022, for instance, suggests a rather limited impact of CBAM on the power generation mix, leading to a slight reduction in coal generation in most Energy Community countries and a decrease of export volumes to the EU (REKK, 2022). This indicates that without comprehensive carbon pricing reforms, CBAM may reduce the competitiveness and export volumes of the countries' key economic sectors. However, it is important to note that the assumptions of such previous modelling efforts should be regularly updated to ensure accuracy.

This is particularly important for Ukraine, where the availability of up-to-date economic data remains a significant challenge. Reliable policy advice requires substantial analytical efforts to account for the profound shifts in Ukraine's economy since Russia's full-scale invasion. The global trade model used in this paper is consistently calibrated on 2017 data. Thus, to accurately reflect Ukraine's wartime economy, the baseline scenario has been adjusted to incorporate key economic transformations. These transformations include changes in energy demand, changes in particular sectors such as construction, demographic shifts resulting from large-scale migration, and revised GDP growth trajectories. Together with a number of other adjustments, explained in more detail in the methodology section of the paper, the modelling framework used in this paper aims to provide useful insights into the impact of CBAM on the Ukrainian economy by conducting a quantitative assessment of the CBAM implications for Ukraine's post-war recovery and modernisation.

The results of our analysis suggest that, in the absence of ambitious domestic decarbonisation efforts, Ukraine's economic structure will largely be preserved. Under the core CBAM scenario, Ukraine's economy experiences only moderate structural changes in our model: Emission-intensive sectors such as steel and fossil power generation contract slightly, whereas cleaner sectors like light manufacturing and services expand modestly. Export impacts are more pronounced, with iron and steel exports declining by over 12%. CO<sub>2</sub> emissions drop by up to 0.8%, a reduction insufficient to drive substantial decarbonisation. The conducted sensitivity scenarios show that only in the event that Scope 2 emissions (i.e. indirect emissions from electricity consumption) are also included in CBAM, will the mechanism have a very negative impact on Ukraine's economy.

In sum, our findings indicate that the EU's CBAM alone is unlikely to significantly harm Ukraine's economy—a positive outlook for the country's war-torn economy. However, this also implies that CBAM alone will not drive substantial economic transformation in

Ukraine and cannot be expected to accelerate its decarbonisation. As the EU accession process includes environmental and climate targets, failure to meet these may complicate Ukraine's EU accession. Therefore, Ukrainian policymakers should simultaneously pursue proactive sustainability measures to advance the country's climate transition in support of EU integration. For the mid-term, we recommend the establishment of a newly designed Ukrainian Decarbonisation and Transformation Fund. If such a fund is well-designed, it could meaningfully support the decarbonisation process of the Ukrainian economy.

This paper is structured to review the impact of CBAM: Firstly, a short overview of the main features of CBAM and its importance for the Ukrainian economy is detailed in Chapter 2, followed by an elaboration on the modelling framework and results in Chapter 4. Chapter 4 concludes with policy implications and recommendations.

## **2. CBAM's modalities and the Ukrainian economy**

With the introduction of the CBAM Regulation in 2023, the EU established a general framework for its application. The Regulation explicitly lists the goods subject to CBAM being: (a) cement, (b) electricity, (c) fertilisers, (d) iron and steel, (e) aluminium, and (f) hydrogen. Direct (Scope 1) and indirect emissions (Scope 2) embedded in these goods must be calculated for CBAM payments, with the exception of iron, steel, aluminium, and hydrogen, where only Scope 1 emissions are considered (EUR-Lex, 2023). CBAM declarants may deduct payments for imports from countries with their own carbon pricing systems, ensuring equivalence with the EU carbon price, and the European Commission maintains a registry of CBAM-covered installations in third countries to track default emission values associated with relevant goods. Data submitted to this CBAM registry must be verified by accredited entities, with the Commission holding general oversight responsibility.

CBAM certificates, which reflect the import of covered commodities into the EU, will be traded through a common EU platform (*ibid.*), allowing these certificates to be resold at an average EU ETS price, updated weekly by the Commission. Repurchasing certificates is limited to one-third of the total certificates acquired by the declarant within the same calendar year. Currently, EU importers are only required to report emissions without a payment obligation. However, the mandatory surrender of CBAM certificates will begin in 2027, covering emissions from goods imported from 2026 forward.

While this is the general CBAM application mode, specific derogations exist: Hereby, one key exemption concerns the power sector. If a country has market coupling with the EU in place, its power sector may be exempted from CBAM if plans to introduce a domestic ETS

by 2030 at a price equivalent to the EU-ETS<sup>3</sup>, and an equivalent carbon pricing system and a climate framework legislation aligned with EU law aiming to reach carbon neutrality by 2050 is in place (ibid.). To enable this full market coupling with the EU, Ukraine must complete the full transposition of its electricity market legislation by the end of 2025. The respective framework draft law has been registered in the Verkhovna Rada and remains under review by the relevant parliamentary committee. However, given the slow progress, achieving full market coupling by the end of 2025 appears unlikely, and the European Commission has stated that full market coupling of Ukraine's electricity sector with the EU is expected by early 2027 (European Commission, 2025). Moreover, Ukraine has yet to introduce mechanisms for market-based or negotiated "equivalent" carbon pricing. Ukrainian exporters could then demonstrate carbon pricing payments made within Ukraine, to be deducted from CBAM charges. However, for this approach to succeed, the EU must recognise Ukraine's carbon pricing system as sufficiently robust and equivalent, a process that Ukraine has not yet completed.

Another important exemption possibility is the force majeure derogation for countries facing extraordinary economic conditions due to factors beyond their control (EUR-Lex, 2023). The mode of CBAM application in such cases will be determined separately by the Commission. This clause is particularly relevant for Ukraine, given the war's impact on its economy, and is often referred to as the '*Ukraine clause*' (Stefanini, 2024). Ukraine could seek a delay based on force majeure, arguing that the ongoing war and its economic repercussions hinder full CBAM compliance. However, this would require strong diplomatic engagement, a formal request to the European Commission, and approval from all EU Member States. At the time of this study, there is no official confirmation that Ukraine has requested the European Commission to delay CBAM implementation under the force majeure exemption.

If Ukraine were to formally apply for a CBAM postponement, the process would follow a structured timeline as outlined in the EU CBAM Regulation. The country or territory seeking exemption must fulfil all conditions specified in paragraph 7 of Annex III and submit two progress reports to the European Commission. Based on these submissions, the European Commission will evaluate whether the country continues to meet the required exemption conditions.

Another critical component of CBAM compliance is the establishment of robust Monitoring, Reporting, and Verification (MRV) systems to accurately account for greenhouse gas emissions. However, Ukraine's progress in this area has been limited. *(See Box below for details on the current state of MRV development in Ukraine.)*

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<sup>3</sup> On February 21, 2025, the government approved a roadmap for developing a national ETS aiming to start with a pilot phase in 2028 (Ministry of Environmental Protection and Natural Resources of Ukraine, 2025).

All in all, Ukraine's economy is characterised by high carbon intensity (Ukrainian Government, 2021) and low carbon pricing, which lies around €0.75 per ton, applicable only to enterprises emitting more than 500 tons of CO<sub>2</sub> annually (Ukrainian Parliament, 2025b). As the country lags behind in meeting its climate targets, and 60-70% of Ukraine's exports are directed to the European market (Albul, 2025), the introduction of CBAM's paid phase is set to take effect next year and is likely to become an important factor for the Ukraine's economic landscape. Current calculations indicate that CBAM's effects will vary across countries and sectors, and CBAM's impact on Ukraine's economy is uncertain. To assess the potential effects of CBAM on the Ukrainian economy, the Green Deal Ukraïna Project has conducted a modelling study, detailed in the following chapter.

### **Ukraine's MRV System – Status and Challenges for CBAM Alignment**

A critical component of CBAM compliance is the establishment of robust Monitoring, Reporting, and Verification (MRV) systems to accurately account for greenhouse gas emissions. Without a functioning MRV system, participation in carbon markets or equivalency recognition under CBAM is not feasible.

Ukraine adopted a framework law on greenhouse gas emissions MRV shortly before the full-scale Russian invasion in January 2021. However, implementation has been severely delayed due to the imposition of martial law in Ukraine, and in March 2022, mandatory reporting under the MRV of greenhouse gas emissions was suspended and replaced by a voluntary one (Radchenko et al., 2025).

In early 2025, the Verkhovna Rada reintroduced mandatory emissions reporting through Bill No. 12131, requiring enterprises emitting more than 500 tons of CO<sub>2</sub> annually to submit emissions data (Ukrainian Parliament, 2025a). This legislative step is essential but insufficient.

Despite these legislative efforts, the practical implementation of the MRV system faces significant challenges. The MRV system is not functioning as intended, and there is a lack of complete data on carbon emissions—data crucial for justifying elements of the Ukrainian ETS. Additionally, Ukraine lacks a sufficient number of experts who could potentially support and administer the operation of the ETS.

To address these challenges, the Ministry of Environmental Protection and Natural Resources of Ukraine, in collaboration with international partners, has initiated training sessions on MRV for plant operators, consultants, verifiers, and other stakeholders. These sessions aim to build capacity and ensure understanding of MRV processes among all involved parties (Ukrainian Climate Office, 2024a).

Nonetheless, consistent and accurate data collection over time is required before the system can produce reliable emissions data for regulatory and market-based use. Until then, the lack of operational MRV remains a bottleneck for Ukraine's ability to engage meaningfully with the CBAM framework.

### **3. The economic consequences of CBAM for Ukraine: Green Deal Ukraine modelling**

For the assessment of the CBAM impact on Ukraine, a modelling framework that explicitly represents the bilateral trade of Ukraine with the EU and other key trading partners, as well as EU climate mitigation measures is needed. Additionally, such a framework should represent the CBAM-covered sectors of the economy. For these reasons, this study relies on the Global Trade Analysis Project Circular Economy (GTAP-CE) global database (Aguiar et al., 2022; Chepeliev et al., 2025) and links it to the global computable general equilibrium model ENVISAGE (Mensbrugghe, 2024) for policy assessment purposes. A key strength of the GTAP-CE database is its detailed representation of global trade, production, and consumption patterns particularly in energy and CBAM-covered industries. For this study, the database was aggregated into 33 regions and 33 activities, with Ukraine explicitly represented as an individual country.

Furthermore, our model incorporates four types of production factors:

1. Labour, differentiated between skilled and unskilled.
2. Capital, allocated across sectors to equalise returns to capital.
3. Land, which was used for the agricultural sector.
4. Natural resources, allocated to fossil fuels and other extraction sectors.

The analysis is based on the GTAP-CE Data Base with data from 2017. While this might appear to be a limitation of our study, it is important to recognise that the most recent officially published input-output tables for Ukraine - issued by the State Statistics Service of Ukraine - also predate Russia's full-scale invasion (SSSU, 2025). Thus, data reflecting the impact of the ongoing war is not publicly available, and the primary methodological challenge lies in the necessity to incorporate the impacts of the war in Ukraine.

To address this, the first step of our analysis was to update the baseline inputs to the year 2025. We rely on a dynamic modelling framework that enables the integration of expert judgments and additional assumptions. This allows us to estimate Ukraine's current economic realities by projecting figures for 2025. In doing so, our baseline scenario explicitly accounts for the impacts of the war across a range of key dimensions. These include sectoral demand shifts—particularly in the construction sector—demographic changes driven by migration, and revised GDP growth projections.

Key considerations include sectoral demand changes (e.g., in the construction sector), demographic shifts due to migration, and GDP growth projections. The model assumes that the population growth rate follows the most recent medium scenario from the Ptoukha Institute for Demography and Social Studies (IDSS, 2020) and labour force growth aligns with the working-age population trend.

GDP trajectories are based on the updated Low-Emissions Development Strategy (LEDS), as presented at COP 2024 (Ukrainian Climate Office, 2024b). As of now, the full text of the updated LEDS has not been made publicly available. However, as one of our authors contributed to its economic impact assessment and had access to the underlying data and assumptions, our modelling can refer to the newest inputs used for the updated LEDS. These inputs also informed our energy sector assumptions calibrated to the TIMES-Ukraine model estimates.

To account for carbon pricing effects, the baseline assumes a gradual increase of the Ukrainian carbon price, starting at 1 USD per ton of CO<sub>2</sub> in 2023 and increasing by 7% annually, reaching 4 USD per ton by 2035. This pathway is broadly based on the LEDS baseline laid out in Ukraine's National Energy and Climate Plan. However, it needs to be noted that even in the net zero emissions scenario, not much mitigation action is implemented before 2035 making the chosen pathway even more robust.

In addition to that, we conducted a sensitivity analysis, in which we tested the impact of CBAM without domestic carbon pricing in Ukraine. As higher domestic carbon prices decrease the economic risks CBAM is posing to the respective country, such an assumption represented a realistic worst-case scenario for Ukraine's economy to account for policy uncertainty and facilitate policy preparedness. In other words, such a sensitivity scenario could be considered as an upper-bound estimate of the CBAM impacts assuming no domestic carbon prices in Ukraine.

In addition to the core CBAM scenario, three sensitivity analyses were conducted to test the robustness of our results under alternative assumptions. These analyses provide additional insights into the economic implications of CBAM for Ukraine and highlight the importance of policy choices in mitigating adverse effects while supporting the country's economic and environmental goals. The analyses focus on the following factors:

- The treatment of domestic carbon prices: This scenario examines how ignoring domestic carbon prices in CBAM charge calculations influences economic outcomes in comparison to the core scenario.
- Exempting electricity exports from CBAM: This analysis assesses the potential impact of removing CBAM charges on electricity exports, which could influence sectoral trade patterns.
- Expanding CBAM emissions coverage: This scenario evaluates the consequences of including Scope 2 emissions for all CBAM-covered commodities.

To better illustrate our results regarding Ukraine's economic development in Figure 1 & 3, we have summarised the 33 activities of our model under terms such as 'Agriculture & Livestock', 'Transport & Logistics', etc. Figure 10 in the Annex shows which activities fall under these terms. Exported commodities illustrated in Figure 2, 5 & 9 have been summarised under the same terms.

By integrating ENVISAGE with the GTAP-CE database and incorporating post-invasion economic shifts, the study offers a realistic assessment of CBAM's impact on Ukraine's economy, as outlined in the following sections.

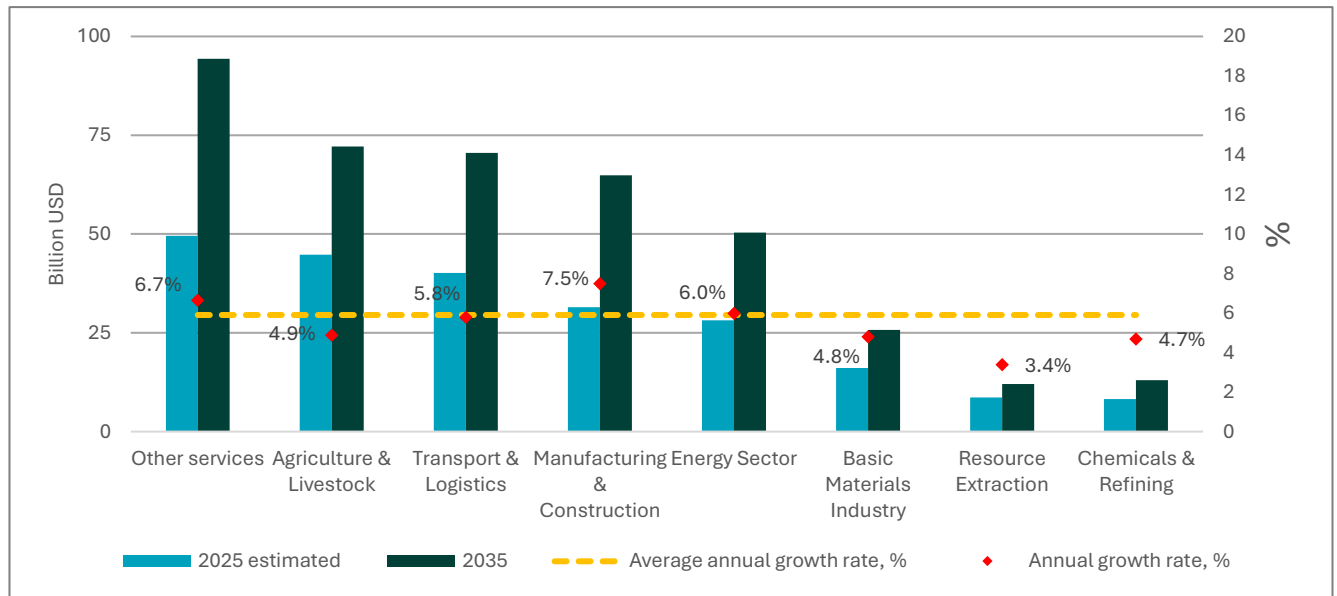
### 3.1. The CBAM-covered sectors in Ukraine and baseline consideration of economic development (no-CBAM scenario)

Ukraine's CBAM-covered sectors have traditionally played a major role in the national economy. According to the National Inventory Report of Ukraine under the United Nations Framework Convention on Climate Change, the total amount of GHG emissions from the ETS sectors (mostly corresponding to CBAM) amounted to an estimated 210 million tCO<sub>2</sub> eq. in 2021, with a particularly large share from the energy sector and metal industries. This would place Ukraine third among the ETS emitters of Europe, with only Poland and Germany having a larger volume of ETS emissions (Iakovenko et al., 2024).

At the same time, Ukraine introduced a carbon tax as a first step toward a national carbon pricing mechanism. However, at only 0.7 EUR per ton of CO<sub>2</sub> emissions, it remains the lowest in Europe (World Bank, 2024). Maintaining this approach would neither incentivise decarbonisation efforts nor generate significant carbon revenues.

Our modelling results indicate that under a no-CBAM scenario, the current economic structure would largely persist. Over the time span from 2025 to 2035, we assume the overall economy to have, driven by a post-war recovery of the Ukrainian economy, an average growth rate of approximately 6% per year. Hereby, sectoral developments vary significantly. The manufacturing & construction sector, propelled by post-war rebuilding efforts, is expected to see the highest growth rate among all sectors. "Other services" rank second, and the energy sector third. The sector with the smallest expected annual growth rate is the mining & resource extraction sector. Figure 1 below shows the assumed individual sector's different annual growth rates organised by size in the baseline scenario.

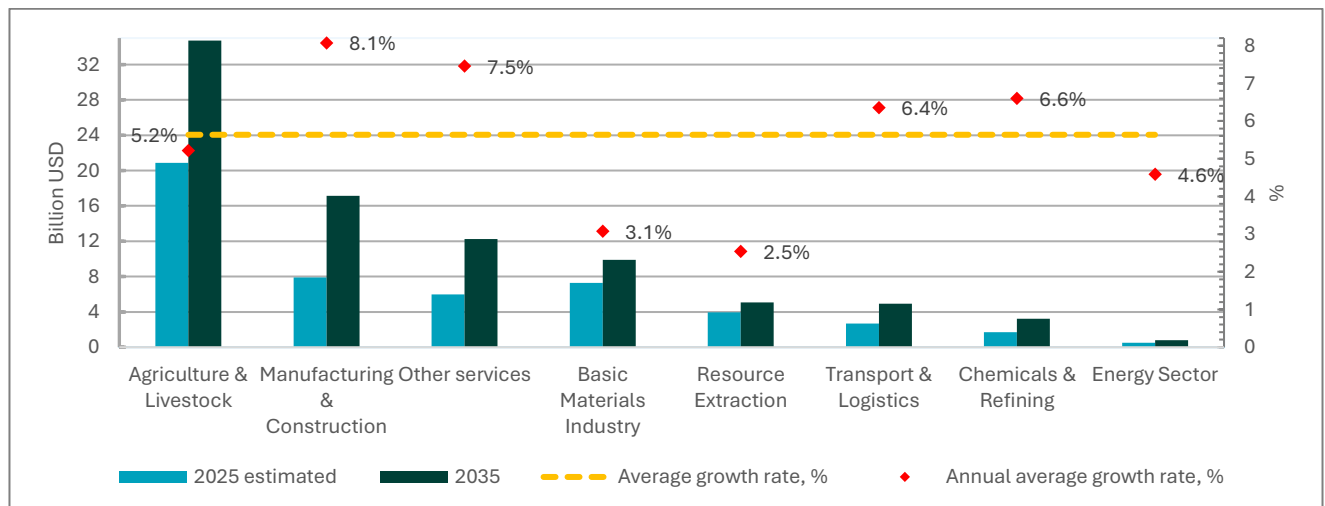
**Figure 1 Baseline scenario (no CBAM): Assumed sectoral growth rates by 2035**



Source: GTAP database, GDU modelling

Export dynamics mirror these sectoral output shifts. We expect an average annual export growth rate of 5.6%, with the resource extraction sector and the basic materials industry having the smallest export growth rates. This follows the trend of Ukraine’s economic development in the last decades, in which the agricultural sector and service overtook the heavy industries in Ukraine’s national export structure (Iakovenko & Zachmann, 2024). The sectors with the highest export growth rates are expected to be manufacturing & construction and other services. Please refer to Figure 2 for a detailed illustration of Ukraine’s export structure development by 2035.

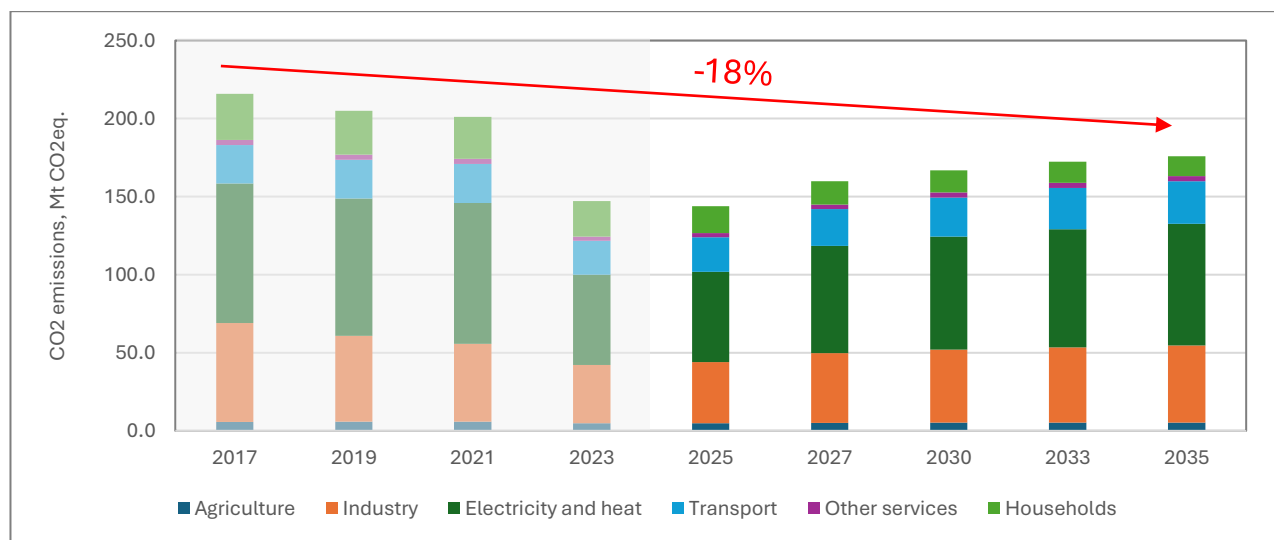
**Figure 2 Baseline scenario (no CBAM): Assumed export structure shifts by 2035**



Source: GTAP database, GDU modelling

Regarding GHG emissions, by 2035, our model assumes CO<sub>2</sub> emissions to be around 18% lower than the reference year level, aligning with the LEDS baseline scenario. However, as Figure 3 below suggests, this reduction is largely driven by the effects of the war. Starting from 2025, the model assumes a slight increase of GHG emissions, which however never reach pre-war levels due to structural changes in industry and the increased adoption of carbon-free technologies in electricity and heat generation.

**Figure 3 Baseline scenario (no CBAM): Assumed development of GHG emissions by 2035**



Source: GTAP database, GDU modelling

Given these baseline trends, the next section examines how CBAM implementation would impact Ukraine’s economy and decarbonisation trajectory.

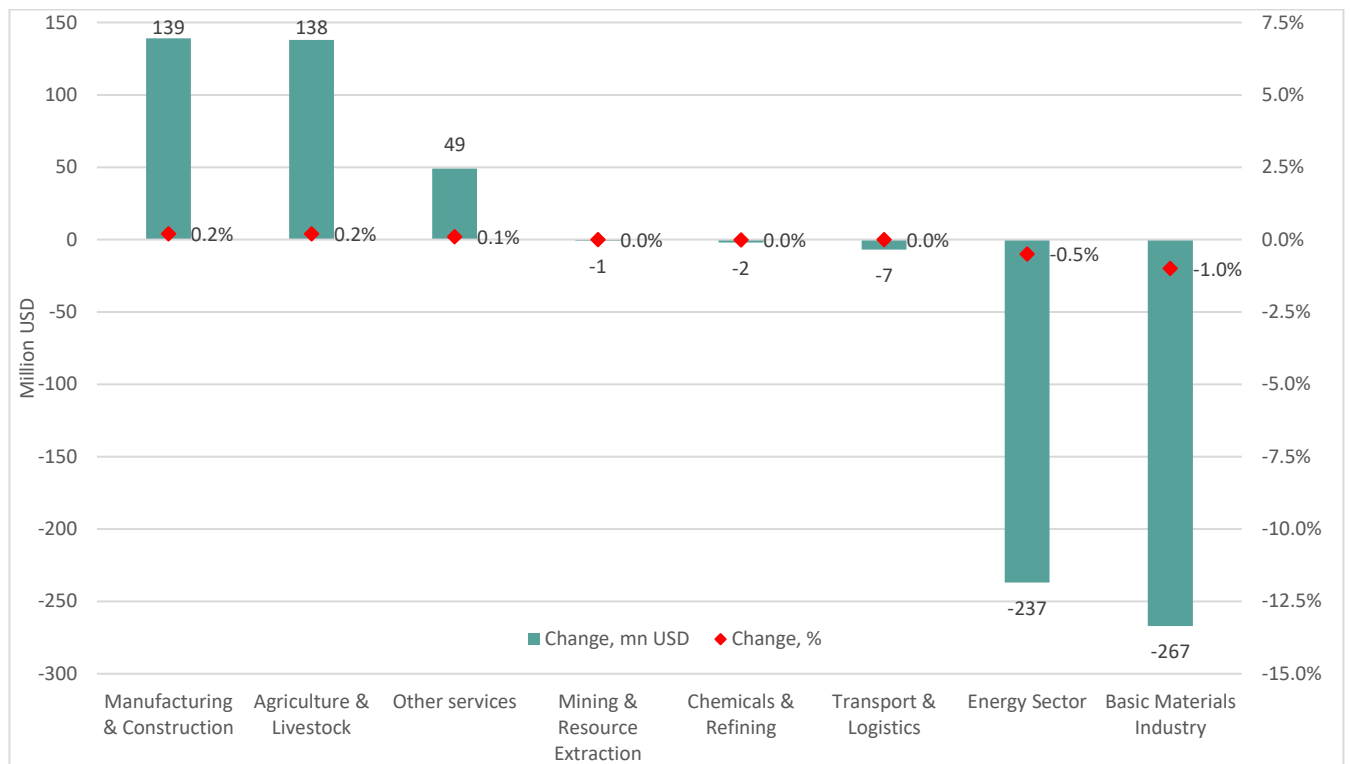
### 3.2. The anticipated CBAM impact on Ukraine’s economy

In the core CBAM scenario, it is assumed that the exports from Ukraine to the EU face CBAM charges, while carbon prices in Ukraine follow the baseline scenario trajectory and gradually increase to 4 USD per tCO<sub>2</sub> by 2035. Furthermore, it is assumed that the implementation of CBAM starts in 2026, with free allocations in the EU phased out by 2034. By doing so, our model aims to capture the impact of the CBAM implementation on Ukraine’s economy.

Our results suggest that the implementation of CBAM would lead to moderate structural shifts in the Ukrainian economy. CBAM-covered emission-intensive sectors, such as steel and the energy sector experience output declines, with iron & steel production decreasing by nearly 250 million USD by 2035 compared to the 2035 level in the baseline scenario and the energy sector by 237 million USD. Cleaner and non-CBAM-covered sectors, on the other hand, see moderate expansions in their output, benefitting from reallocated production factors like capital and labour. Sectors that expand include light

manufacturing, crops and services. However, as the figure below shows all expected output changes are rather moderate, and overall economic growth remains almost the same.

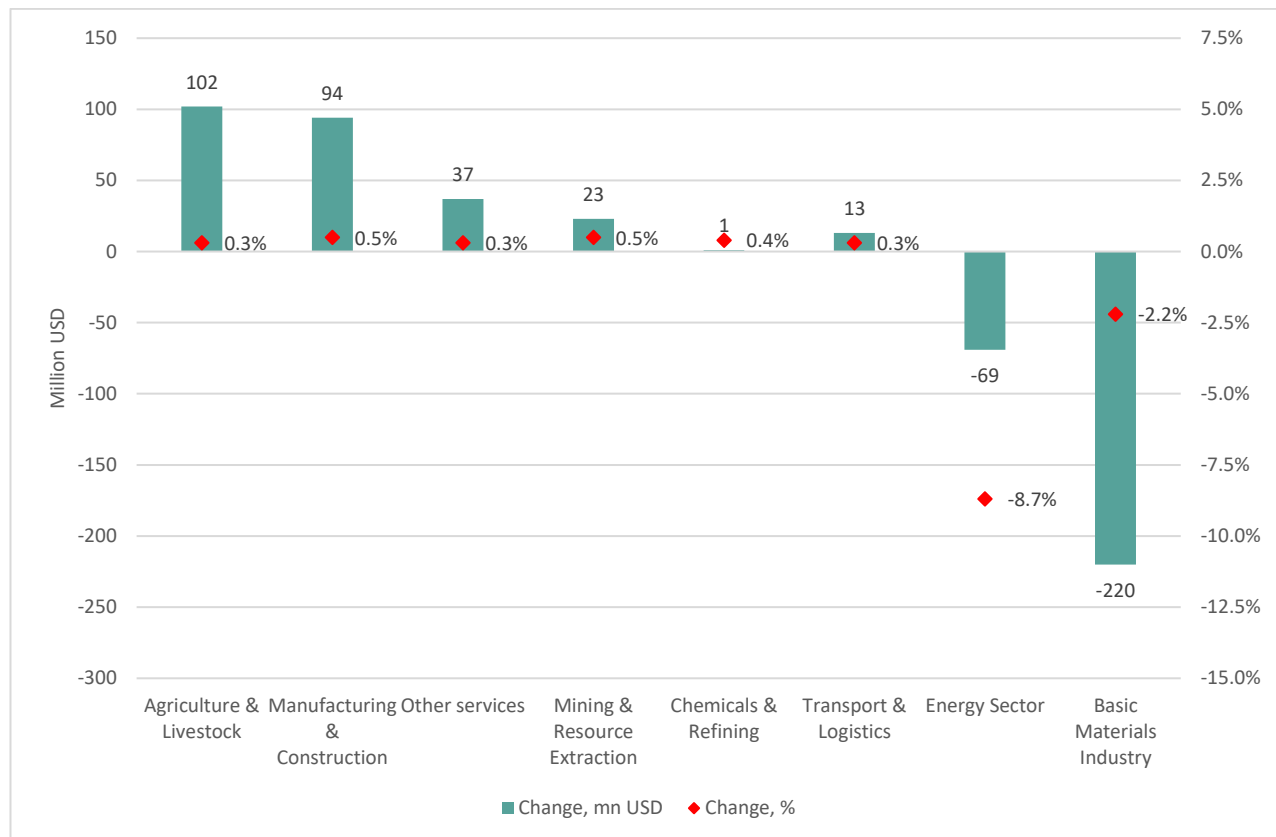
**Figure 4 CBAM-scenario: Sectoral output difference in 2035 (compared to 2035 in the baseline scenario)**



Source: GTAP database, GDU modelling

Our analysis shows further that exports are impacted more significantly than output, as CBAM directly affects trade. Under the CBAM scenario, we estimate that carbon-intensive sectors such as cement will export 13.8% less in 2035 compared to the no-CBAM scenario. The energy sector sees an export decline of nearly 9%, while iron and steel exports fall by 3.1%. Other CBAM-affected industries experience less substantial changes in their exports. Figure 5 below provides an overview for the modelled development of the aggregated sectors.

**Figure 5 CBAM-scenario: Changes in the sectoral exports in 2035 (compared to 2035 in the baseline scenario)**



Source: GTAP database, GDU modelling

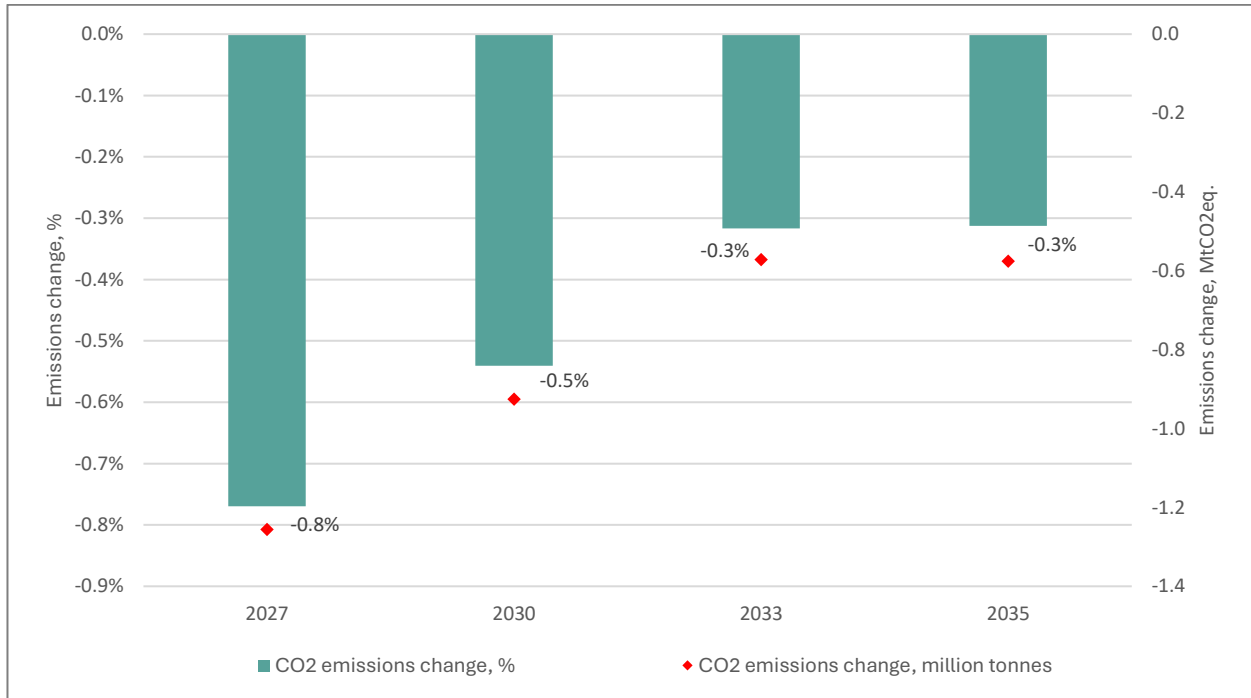
At the macro level, we estimate a limited impact across key indicators:

- **Welfare<sup>4</sup> losses remain small**, not exceeding 135 million USD per year, which is less than 0.1% compared to the reference scenario.
- **GDP impact is even less substantial than welfare impacts:** ~5.9% average economic growth in the CBAM scenario compared to ~6% in the no-CBAM scenario.
- **CO<sub>2</sub> emissions decline slightly** (0.3%-0.8%), but at a more significant rate than welfare and GDP implying a reduction in the carbon intensity of domestic production in Ukraine.

It should be noted that both welfare and emissions experience more substantial changes at the beginning of the simulated period. As the economy adjusts to the initial shock and Ukraine's emission intensity declines under the reference scenario, the relative magnitude of these impacts diminishes over time. Two figures below illustrate the described shifts in welfare and GHG emissions under the core CBAM scenario.

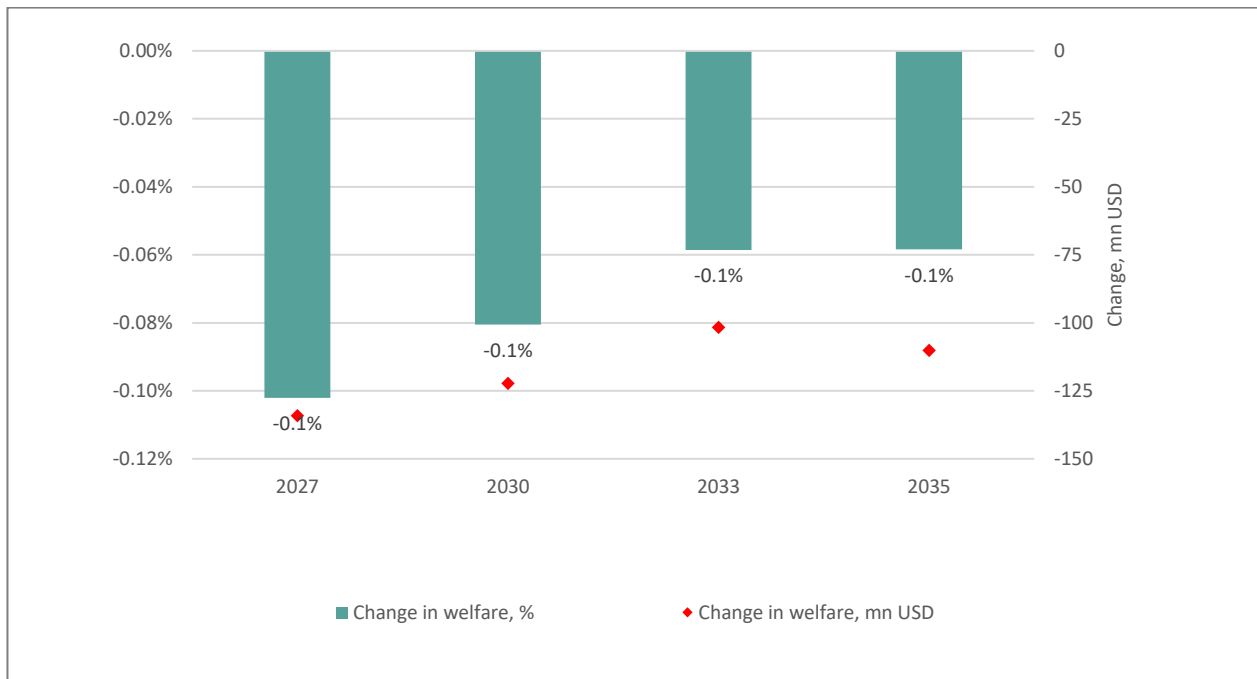
<sup>4</sup> measured using Hicksian equivalent variation.

**Figure 6 CBAM scenario: Change in CO<sub>2</sub> emissions by 2035 (compared to the baseline scenario)**



Source: GTAP database, GDU modelling

**Figure 7 CBAM scenario: Change in welfare by 2035 (compared to the baseline scenario)**



Source: GTAP database, GDU modelling

Overall, our modelling results suggest that CBAM will have a rather moderate impact on Ukraine's economy, and, while impacts on emissions might be more substantial (with reductions in CO<sub>2</sub> emissions by up to 0.8%), these are still not sufficient to incentivise domestic mitigation efforts.

It is worth noting that the actual impact of CBAM may differ from the estimates presented here, particularly in light of Ukraine's pre-EU-accession obligations and ambitions. The country may face constraints in diversifying and reallocating its exports without jeopardising its goal of integrating into EU markets. A more detailed analysis of CBAM implementation in Ukraine could help identify the most balanced approach.

### 3.3. The possible modes of CBAM application in Ukraine

To better explore the potential impacts of CBAM on the Ukrainian economy, three additional sensitivity scenarios have been analysed:

#### **1) Exclusion of Domestic Carbon Prices in CBAM Charges**

This scenario assumes that domestic carbon prices in Ukraine and other EU trading partners are not considered when calculating CBAM charges. However, since the reference scenario assumes that Ukraine's carbon price reaches only 4 USD per tCO<sub>2</sub> by 2035, the results of this sensitivity analysis do not significantly deviate from the core CBAM simulation. At the macroeconomic level, overall impacts remain within 2-3% of the core scenario results. The only country experiencing a notable impact is the United Kingdom, where relatively high carbon prices - comparable to EU ETS levels - lead to more substantial effects compared to other EU trading partners.

#### **2) Exemption of Electricity Exports from CBAM Coverage**

Under this scenario, electricity exports to the EU are exempted from CBAM charges. As discussed above, such exemptions could be granted under certain conditions for EU trading partners. In the core CBAM scenario, it is assumed that all countries exporting electricity to the EU are subject to CBAM charges, with emission intensity estimated based on the national average emissions of electricity generation in the country of origin. As a result, electricity exports from Ukraine decline in this scenario by approximately 69 million USD (or 9%) in 2035 compared to the reference scenario. However, when electricity exports are excluded from CBAM, this adverse impact is fully eliminated, leading to a slight increase in electricity exports (+0.6 million USD). Since electricity exports remain stable, the shift in exports toward non-CBAM sectors is also less pronounced.

#### **3) Expansion of CBAM emissions scope to include Scope 2 for selected sectors**

While our CBAM scenario assumes - in line with current EU legislation (EUR-Lex, 2023) - that the application of CBAM will only cover the direct emissions for iron, steel and aluminium, the EU checks the possibility of expanding the coverage of indirect emissions.

Therefore, this sensitivity scenario tests the impact of extending CBAM coverage to include Scope 2 emissions for iron, steel, and aluminium.

Our results show that such an extension would lead to more substantial changes in sectoral output, exports, and overall macroeconomic impacts for Ukraine. Specifically, iron and steel exports decline by over 730 million USD (-10.5%) in 2035 compared to the reference scenario - more than three times the impact observed in the core CBAM scenario (Figure 5). This also triggers a larger compensatory increase in the exports of selected non-CBAM sectors, such as crops, light manufacturing, services, and processed food. Overall welfare decreases by 0.15% - more than double the welfare reduction observed in the core CBAM scenario.

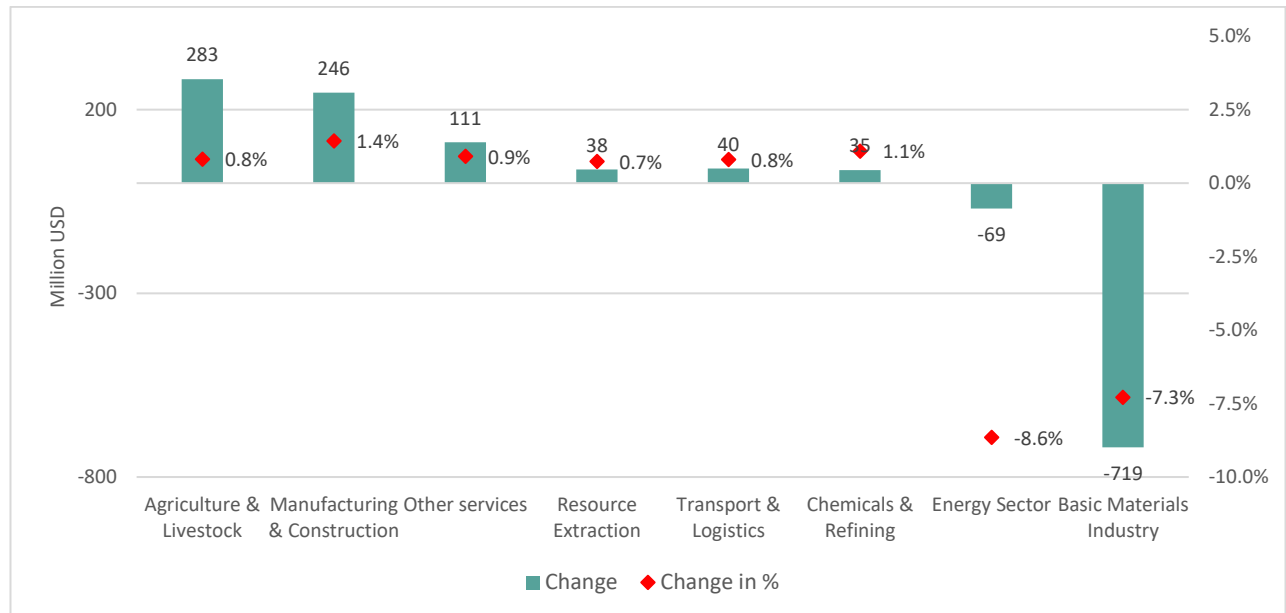
Among the three sensitivity scenarios, the inclusion of Scope 2 emissions for iron, steel, and aluminium in CBAM coverage presents the most significant economic challenge for Ukraine. This scenario results in the largest declines in sectoral output, exports, and overall welfare, underscoring how critical the precise design of CBAM will be for its eventual impact on Ukraine’s economy.

Following Figure 8 summarises the results of the three sensitivity scenarios, while Figure 9 shows the impact on exports in case of an expansion of Scope 2 emissions coverage.

**Figure 8 Overview of sensitivity scenarios**

<b>Scenario</b>	<b>Impact on Exports</b>	<b>Impact on Welfare</b>
No domestic carbon price consideration	Minor	<2% of core CBAM scenario
Electricity exempted from CBAM	Eliminates export decline	Negligible impact
Scope 2 emissions included	Largest negative impact (-10.5% steel exports)	-0.15% welfare

**Figure 9 Sensitivity scenario: Change in sectoral exports of Ukraine if CBAM covers all Scope 2 emissions for all commodities (compared to CBAM scenario)**



#### 4. CBAM in Ukraine: A largely non-disruptive and insufficient driver

The results of our analysis suggest that CBAM will not have any significant negative effect on Ukraine’s overall economy. When CBAM charges are applied to Ukrainian EU exports, emission-intensive sectors such as steel and fossil-based power generation are expected to decline, while cleaner sectors like light manufacturing, agriculture, and services see moderate growth compared to the baseline scenario. The most significant impact of CBAM is on exports rather than output, with carbon-intensive sectors such as cement exporting 13.8% less in 2035 compared to the no-CBAM scenario, and the energy sector experiencing an export decline of nearly 9%. However, welfare losses remain limited at under 135 million USD per year, and the overall GDP impact is even more negligible. CO<sub>2</sub> emissions decrease slightly compared to the baseline scenario, between 0.3%-0.8% per year, reflecting a very moderate influence of CBAM on the reduction of Ukraine’s carbon intensity. Only in the scenario where CBAM is extended to include Scope 2 emissions does the mechanism pose a significant economic risk to Ukraine.

This suggests a double-edged outcome: While Ukraine’s war-torn economy will likely not be significantly harmed by CBAM in its current form, the mechanism is also unlikely to trigger the structural transformation needed for Ukraine’s decarbonisation process. Therefore, the greater threat is that relying on CBAM alone increases the risk Ukraine failing its climate and environment targets, while Ukraine’s economy will remain largely dependent on traditional industries, with only moderate sectoral shifts. Yet, aligning with EU environmental and climate standards - including Chapters 27 (Environment) and 15

(Energy) of the EU acquis - is a core requirement for EU accession. Insufficient progress in these areas may hinder Ukraine's integration into the European Union.

Thus, CBAM might not pose severe challenges to Ukraine's economy, but our analysis underscores the urgent need for domestic action to enable the sustainable transformation of the country. Relying on CBAM alone is insufficient to drive decarbonisation and risks complacency. Ukrainian policymakers must therefore pursue structural reforms and develop green industrial policies that support decarbonisation. The current Decarbonisation Fund, while a step in the right direction, is vastly under-resourced. In 2024, it issued only 16 loans totalling about €4 million. To effectively support the modernisation/decarbonisation of high-emission sectors like Ukraine's Basic Material Industry, which experiences an output decline of more than USD 250 million in our CBAM scenario, the Fund must be significantly scaled up.

We believe that a national fund that can only draw on a very restricted budget from Ukraine's limited domestic CO<sub>2</sub> pricing will remain inadequate to meaningfully support the country's decarbonisation efforts. Instead, a promising approach could be to massively step up Ukrainian carbon pricing and match a share of the corresponding revenues with international funding. This would also require a rethinking of the governance structure of the current fund – one in which both Ukrainian and international partners would have a say. An expanded and jointly managed fund could provide the financial means to support a just transition, mitigate possible economic and social downsides, promote the modernisation of carbon-intensive sectors in Ukraine, and facilitate the broader transformation of Ukraine's economy in line with EU climate and energy goals.

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## Annex

**Figure 10 Mapping of Economic Activities to Sector Terms Used in the Analysis**

Activities as depicted in our paper	Activities represented in the model	Disaggregated GTAP-CE activities
Agriculture & Livestock	Crops	Paddy rice (PDR), Wheat (WHT), Cereal grains nec (GRO), Vegetables, fruit, nuts (V_F), Oil seeds (OSD), Sugar cane, sugar beet (C_B), Plant-based fibers (PFB), Crops nec (OCR), Forestry (FRS), Processed rice (PCR), Sugar (SGR)
	Processed food	Bovine meat products (CMT), Meat products nec (OMT), Vegetable oils and fats (VOL), Dairy products (MIL), Food products nec (OFD), Beverages and tobacco products (B_T), Fishing (FSH)
	Livestock	Bovine cattle, sheep and goats, horses (CTL), Animal products nec (OAP), Raw milk (RMK), Wool, silk-worm cocoons (WOL),
Manufacturing & Construction	Other manufacturing	Textiles (TEX), Wearing apparel (WAP), Leather products (LEA), Wood products (LUM), Metal products (FMP), Machinery and equipment nec (OME), Motor vehicles and parts (MVH), Transport equipment nec (OTN), Manufactures nec (OMF), Paper products, publishing (PPP), Plastic primary (PLP), Plastic secondary (PLS), Plastic recycling (PLR)
	Construction	Construction (CNS)
	Computers and electronics	Computer, electronic and optical products (ELE), Electrical equipment (EEQ)
Mining & Resource Extraction	Oil	Oil (OIL)

	Coal	Coal (COA)
	Gas	Gas (GAS), Gas manufacture, distribution (GDT)
	Ore mining	Mining of iron ores (MOI), mining of aluminum (bauxite) ores (MAO), mining of copper ores (MCU), mining of other metal ores (MOO), Mining of other ores (MOO)
Transport & Logistics	Transport services	Water transport (WTP), Air Transport (ATP), Other transport (OTP)
	Trade and warehousing	Trade (TRD), Warehousing and support activities (WHS)
Chemicals & Refining	Other chemicals	Basic pharmaceutical products (BPH), Rubber products (RBR), Other chemicals (XCH)
	N-fertilizer	N-fertilizer (NFT)
	K-fertilizer	K-fertilizer (KFT)
	P-fertilizer ( <i>not reported due to low levels of output</i> )	P-fertilizer (PFT)
	Refined oil	Petroleum, coal products (P_C)
Basic Metal Industry	Primary aluminium ( <i>not reported due to low levels of output</i> )	Aluminum – primary (APP)
	Secondary aluminium	Aluminum – secondary (APS)
	Other metals	Copper – primary (CPP), Copper – secondary (CPS), Other metals – primary (MPP), Other metals – secondary (MPS), Recycling - iron and steel (RIS), Recycling – aluminum (RAL), Recycling – copper

		(RCP), Recycling other metals (ROM), Metals casting (MEC)
	Cement	Cement (CEM)
	Primary iron and steel	Iron and steel – primary (ISP)
	Secondary iron and steel	Iron and steel – secondary (ISS)
	Other non-metallic minerals	Other non-metallic minerals (NMX)
Energy Sector	Hydro power	Hydro power baseload (HydroBL), Hydro power peakload (HydroP)
	Solar power	Solar power (SolarP)
	Gas and oil power	Gas power baseload (GasBL), Gas power peakload (GasP), Oil power baseload (OilBL), Oil power peakload (OilP)
	Electricity transmission and distribution	Electricity transmission and distribution (TnD)
	Wind power	Wind power (WindBL)
	Coal power	Coal power baseload (CoalBL)
	Nuclear power	Nuclear power (NuclearBL)
	Other power	Other baseload (OtherBL)
Other services	Other services	Water (WTR), Communication (CMN), Financial services nec (OFI), Insurance (formerly isr) (INS), Real estate activities (RSA), Business services nec (OBS), Recreational and other services (ROS), Accommodation, Food and service activities (AFS), Public Administration and defense (OSG), Education (EDU), Human health and social work activities (HHT), Dwellings (DWE)