Implications of EU Carbon Border Adjustment Mechanism for Turkey - draft results

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Outline

• Approach
• Presentation of draft results
• Key observations
EU CBAM ‘near-term’ implication

General approach and assumptions:

- Calculation estimates the additional burden incurred by Turkish exporters to the EU27 of selected products in 2023 (assumed to be the first year of CBAM in force)

- CBAM cost calculation is based on 3 components:
  1. The carbon intensity value of a product (expressed in t\(\text{CO}_2\)/t of product, or t\(\text{CO}_2\)/GWh): The additional cost imposed on exports assumed to be based on a default carbon intensity value e.g. the average carbon intensity of EU producers, or of the producers in the exporting country.
  2. The volume of exported products: Exports quantity (tons, GWh) in 2023 assumed unchanged compared to 2017-2019 annual average.
  3. The carbon price (EUR/t \(\text{CO}_2\)): The level of adjustment (EUR/t \(\text{CO}_2\)) would mirror the price of emissions allowances under the EU ETS - assumed price of EUR 50/t \(\text{CO}_2\) in 2023

- Analysis of the first order effect of the trade impact bilaterally between Turkey and the EU, assuming unchanged trade flows compared to average 2017-19 values.

- Different CBAM scenarios assess the range of possible impact of CBAM design (see next two slides)

- Sectors of interest: Electricity, cement, aluminium, steel
Scenarios (1)

- Six scenarios (see next slide) that reflect possible CBAM design
- Based on options for 2 CBAM design elements:
  1. CO2 intensity (t CO2 emissions/ton of product)
     1a. Exporting country-specific average (nonEU CO2 intensity),
     1b. EU average (EU CO2 intensity),
     1c. Differential between average intensity in the exporting country and the EU (\( \Delta \text{CO2 intensity} \)).
  2. Crediting of foreign climate policy:
     2a. Yes - CBAM will credit policies in exporting countries entailing a carbon price (\( \Delta \text{CO2 price} \));
     2b. No - the full EU carbon price will apply to exports (EUACO2 price)
- For each of the six scenarios, results presented for two cases:
  I. CBAM will account for direct emissions only (Scope 1)
  II. CBAM will account for direct emissions (Scope 1) & indirect emissions (Scope 2)
## Scenarios (2)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Approach to calculating CBAM burden</th>
<th>Explanatory notes</th>
</tr>
</thead>
</table>
| (1)      | $EUA_{C02\, price} \times EU_{C02\, intensity}$ | • Carbon price for imports to EU equals price of EU ETS allowances ($EUA_{C02\, price}$)  
• Exporters emissions determined based on average CO₂ intensity of EU producers ($EU_{C02\, intensity}$) |
| (2)      | $EUA_{C02\, price} \times nonEU_{C02\, intensity}$ | • Carbon price for imports to EU equals price of EU ETS allowances ($EUA_{C02\, price}$)  
• Exporters emissions determined based on average CO₂ intensity in exporting countries ($nonEU_{C02\, intensity}$) |
| (3)      | $EUA_{C02\, price} \times \Delta_{C02\, intensity}$ | • Carbon price for imports to EU equals price of EU ETS allowances ($EUA_{C02\, price}$)  
• Exporters pay for the part of average CO₂ intensity in exporting countries in excess to the average EU CO₂ intensity ($\Delta_{C02\, intensity}$) |
| (4)      | $\Delta_{C02\, price} \times EU_{C02\, intensity}$ | • Crediting for foreign carbon pricing policies (carbon tax or ETS), carbon price for imports equals the difference between EU ETS allowance price and carbon prices in exporting countries ($\Delta_{C02\, price}$)  
• Exporters emissions determined based on average CO₂ intensity of EU producers ($EU_{C02\, intensity}$) |
| (5)      | $\Delta_{C02\, price} \times nonEU_{C02\, intensity}$ | • Crediting for foreign carbon pricing policies (carbon tax or ETS), carbon price for imports equals the difference between EU ETS allowance price and carbon prices in exporting countries ($\Delta_{C02\, price}$)  
• Exporters embedded in imports determined based on the average CO₂ intensity in exporting countries ($nonEU_{C02\, intensity}$) |
| (6)      | $\Delta_{C02\, price} \times \Delta_{C02\, intensity}$ | • Crediting for foreign carbon pricing policies (carbon tax or ETS), carbon price for imports equals the difference between EU ETS allowance price and carbon prices in exporting countries ($\Delta_{C02\, price}$)  
• Exporters pay for the part of average CO₂ intensity in exporting countries in excess to the average EU CO₂ intensity ($\Delta_{C02\, intensity}$) |
### Notes:

- EU27: grid emissions factor value for year 2018; source: European Environment Agency
- Turkey: grid emissions factor value for year 2018; source: calculated based on UNFCCC GHG inventory and el. production.
Notes:

- Scope 1 intensity values sourced from the Getting the Numbers Right (GNR) database managed by the Global Cement and Concrete Association (GCCA).
- Scope 2 intensities calculated based on electricity intensity data from GNR, and electricity grid emissions factors.
- Regional granularity of GNR data: for Turkey clinker and Portland cement data concern the region ‘Middle East’, white cement data concern ‘world’
Cement – CBAM payment/current prices

Competitiveness loss, cement exports from Turkey
(CBAM payment/current prices)

Scenario 1 - EUA price & EU CO2 intensity
Scenario 2 - EUA price & non-EU CO2 intensity
Scenario 3 - EUA price & Δ CO2 intensity
Scenario 4 - Δ CO2 price & EU CO2 intensity
Scenario 5 - Δ CO2 price & non-EU CO2 intensity
Scenario 6 - Δ CO2 price & Δ CO2 intensity

CLINKER Scope 1
CLINKER Scope 1 & 2
PORTLAND CEMENT Scope 1
PORTLAND CEMENT Scope 1 & 2
WHITE CEMENT Scope 1
WHITE CEMENT Scope 1 & 2

Preliminary results
## Steel

### CO2 intensity - tCO2/ton of crude steel

<table>
<thead>
<tr>
<th></th>
<th>Scope 1 emissions</th>
<th>Scope 1 &amp; 2 emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU27</td>
<td>0,71</td>
<td>1,09</td>
</tr>
<tr>
<td>Turkey</td>
<td>0,40</td>
<td>0,85</td>
</tr>
</tbody>
</table>

**Notes:**

- CO2 intensities for crude steel calculated based on:
  - Emission intensities associated with specific production routes (BF-BOF, scrap-based EAF) from IEA Iron and Steel Technology Roadmap (2020)
  - Crude steel production mix by process technology based on World Steel Association data

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**CBAM payments on steel exports from Turkey (€ million / year in 2023):**

- **Scenario 1** - EUA price & EU CO2 intensity
- **Scenario 2** - EUA price & non-EU CO2 intensity
- **Scenario 3** - EUA price & Δ EU CO2 intensity
- **Scenario 4** - Δ CO2 price & EU CO2 intensity
- **Scenario 5** - Δ CO2 price & non-EU CO2 intensity
- **Scenario 6** - Δ CO2 price & Δ CO2 intensity

**Competitiveness loss, steel exports from Turkey (CBAM payment /current prices):**

- **Scenario 1** - EUA price & EU CO2 intensity
- **Scenario 2** - EUA price & non-EU CO2 intensity
- **Scenario 3** - EUA price & Δ EU CO2 intensity
- **Scenario 4** - Δ CO2 price & EU CO2 intensity
- **Scenario 5** - Δ CO2 price & non-EU CO2 intensity
- **Scenario 6** - Δ CO2 price & Δ CO2 intensity

**Numbers:**

- **Preliminary results**
- **EU27**
  - Scope 1: 0,71
  - Scope 1 & 2: 1,09
- **Turkey**
  - Scope 1: 0,40
  - Scope 1 & 2: 0,85

**CBAM payments on steel exports from Turkey (€ million / year in 2023):**

- **Scenario 1** - EUA price & EU CO2 intensity
  - Scope 1: 120,8
  - Scope 1 & 2: 225,6
- **Scenario 2** - EUA price & non-EU CO2 intensity
  - Scope 1: 144,0
  - Scope 1 & 2: 126,8
- **Scenario 3** - EUA price & Δ EU CO2 intensity
  - Scope 1: 0
  - Scope 1 & 2: 0
- **Scenario 4** - Δ CO2 price & EU CO2 intensity
  - Scope 1: 96,6
  - Scope 1 & 2: 180,4
- **Scenario 5** - Δ CO2 price & non-EU CO2 intensity
  - Scope 1: 115,2
  - Scope 1 & 2: 101,5
- **Scenario 6** - Δ CO2 price & Δ CO2 intensity
  - Scope 1: 0
  - Scope 1 & 2: 0

**Competitiveness loss, steel exports from Turkey (CBAM payment /current prices):**

- **Scenario 1** - EUA price & EU CO2 intensity
  - Scope 1: 6,6%
  - Scope 1 & 2: 4,4%
- **Scenario 2** - EUA price & non-EU CO2 intensity
  - Scope 1: 5,2%
  - Scope 1 & 2: 2,5%
- **Scenario 3** - EUA price & Δ EU CO2 intensity
  - Scope 1: 5,3%
  - Scope 1 & 2: 0,018%
- **Scenario 4** - Δ CO2 price & EU CO2 intensity
  - Scope 1: 2,0%
  - Scope 1 & 2: 3,5%
- **Scenario 5** - Δ CO2 price & non-EU CO2 intensity
  - Scope 1: 0,0%
  - Scope 1 & 2: 4,2%
- **Scenario 6** - Δ CO2 price & Δ CO2 intensity
  - Scope 1: 0,0%
  - Scope 1 & 2: 0,0%

**Numbers:**

- **Preliminary results**
- **EU27**
  - Scope 1: 0,71
  - Scope 1 & 2: 1,09
- **Turkey**
  - Scope 1: 0,40
  - Scope 1 & 2: 0,85
Aluminium

<table>
<thead>
<tr>
<th></th>
<th>CO2 intensity - tCO2/ton of primary aluminium</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scope 1 emissions</td>
</tr>
<tr>
<td>EU27</td>
<td>2,1</td>
</tr>
<tr>
<td>Turkey</td>
<td>2,1</td>
</tr>
</tbody>
</table>

Notes:

• **Scope 1 intensity**
  • Covers CO2 and non-CO2 emissions from: Anode/Paste, electrolysis.
  • Based on global average data by International Aluminium Institute (IAI).

• **Scope 2 intensity**:
  • Based on IAI data concerning electricity intensity and electricity grid emissions factors

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![CBAM payments on aluminium exports from Turkey (€ million / year in 2023)](image)

![Competitiveness loss, aluminium exports from Turkey (CBAM payment /current prices)](image)
Aluminium

Competitiveness loss, aluminium exports from Turkey (CBAM payment /current prices)

- **Scenario 1** - EUA price & EU CO2 intensity
- **Scenario 2** - EUA price & non-EU CO2 intensity
- **Scenario 3** - EUA price & Δ CO2 intensity
- **Scenario 4** - Δ CO2 price & EU CO2 intensity
- **Scenario 5** - Δ CO2 price & non-EU CO2 intensity
- **Scenario 6** - Δ CO2 price & Δ CO2 intensity
CBAM payments in 2023 - total

• CBAM “bill” at the border of EUR 589,2 million in 2023 million (Scenario 2; Scope 1 & 2 emissions);

• About 0,07% of Turkey’s GDP forecast in 2023.
Key observations (1)

- Energy-intensive and trade-exposed (EITE) sectors like cement, steel, aluminum, as well as electricity are highly likely candidates to be covered by CBAM in the near to medium-term.

- Turkish exporters of electricity, cement, steel, and aluminum products could face a total CBAM “bill” at the border of EUR 589 million in 2023 million (Scenario 2; Scope 1 & 2 emissions); CBAM payments would represent 0.07% of Turkey’s GDP forecast in 2023.

- CBAM payments can represent a significant share of current prices for some products
  - e.g. up to about 50% for cement, 12% aluminium, 5-6% for steel
  - Differentiated by product type. The higher in the value chain the lower the share e.g. up to 19% for unwrought aluminium, but up to 8% for articles of aluminium.

- CBAM diversified impacts depending on adopted design, e.g. product scope, emissions scope, emissions intensity
Key observations (2)

- **Product scope:**
  - Several unknowns on product scope.
  - Steel & aluminium: Analysis assumes that a CBAM would apply to imports of raw materials (e.g. primary aluminium, crude steel), as well as semi-finished products and articles of these materials (e.g. aluminium rolled products, steel pipes).
    - Total ‘CBAM bill’ would be lower in case only upstream materials are covered, and higher the more downstream products in the value chain are covered.
  - Choice of applicable default CO2 intensity values (EU or foreign, etc) has a significant impact on costs:
    - Exporting country CO2 intensity not necessarily higher than EU intensity (e.g. steel in Turkey)
    - Allow for process to challenge carbon intensity default values: foreign producers could be granted the possibility to individually prove that they are “cleaner” than any default values; This could potentially reduce the tax burden imposed by the EU CBAM
    - Level of the adjustment (EUR/tCO2) has an important bearing on the magnitude of the impact: calculations based on CO2 price forecast for 2023 EUR 50/tCO2; Since May 2021 EU ETS prices > EUR 50tCO2; Carbon pricing in exporting countries to likely be deducted from the payable level of adjustment (ΔCO2 price), reducing CBAM burden.
Thank you!
Appendix
## Turkey’s exports to the EU27, 2017-19 avg

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>CODE</th>
<th>PRODUCT</th>
<th>Exports quantity (tons or GWh)</th>
<th>Exports value (EUR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement</td>
<td>HS 252310, HS 252329, HS 252321</td>
<td>Clinker, portland and white cement</td>
<td>1,295,797 tons</td>
<td>76,325,291</td>
</tr>
<tr>
<td></td>
<td>HS 252310</td>
<td>Cement clinkers</td>
<td>431,095 tons</td>
<td>19,132,445</td>
</tr>
<tr>
<td></td>
<td>HS 252329</td>
<td>Portland cement (excl. white, whether or not artificially coloured)</td>
<td>535,126 tons</td>
<td>28,462,503</td>
</tr>
<tr>
<td></td>
<td>HS 252321</td>
<td>White portland cement, whether or not artificially coloured</td>
<td>329,496 tons</td>
<td>28,730,344</td>
</tr>
<tr>
<td>Aluminium</td>
<td>HS 7601, 7603-7616</td>
<td>Aluminium trade under HS chapter 76 excluding scrap (HS 7602)</td>
<td>415,568 tons</td>
<td>1,328,971.910</td>
</tr>
<tr>
<td></td>
<td>7601</td>
<td>Unwrought aluminium</td>
<td>35,693 tons</td>
<td>70,215.182</td>
</tr>
<tr>
<td></td>
<td>HS 7604, 7408, 7409</td>
<td>Extrusions</td>
<td>106,084 tons</td>
<td>379,669.799</td>
</tr>
<tr>
<td></td>
<td>HS 7606, 7610</td>
<td>Rolled sheet</td>
<td>150,073 tons</td>
<td>434,489.652</td>
</tr>
<tr>
<td></td>
<td>HS 7607</td>
<td>Aluminium foil</td>
<td>70,128 tons</td>
<td>204,658.034</td>
</tr>
<tr>
<td></td>
<td>HS 7603</td>
<td>Powders and flakes</td>
<td>538 tons</td>
<td>1,040.761</td>
</tr>
<tr>
<td></td>
<td>HS 7605</td>
<td>Aluminium wire</td>
<td>12,810 tons</td>
<td>28,624.276</td>
</tr>
<tr>
<td></td>
<td>HS 7611, 7612, 7613, 7614, 7615, 7616</td>
<td>Articles of aluminium</td>
<td>40,241 tons</td>
<td>210,274.206</td>
</tr>
<tr>
<td>Iron and steel</td>
<td>HS 7205-7217 and HS 73</td>
<td>Iron and steel (excl. pig iron, ferro-alloys, ferrous products obtained by direct reduction of iron, ferrous waste and scrap, stainless steel and other alloys) and articles thereof</td>
<td>6,375,308 tons</td>
<td>4,924,869.582</td>
</tr>
<tr>
<td></td>
<td>HS 7205-7217</td>
<td>Iron and steel (excl. pig iron, ferro-alloys, ferrous products obtained by direct reduction of iron, ferrous waste and scrap, stainless steel and other alloys)</td>
<td>4,805,893 tons</td>
<td>2,581,879.998</td>
</tr>
<tr>
<td></td>
<td>HS 73</td>
<td>Articles of iron and steel</td>
<td>1,569,415 tons</td>
<td>2,342,989.584</td>
</tr>
</tbody>
</table>

**Electricity**

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>CODE</th>
<th>PRODUCT</th>
<th>Exports quantity (tons or GWh)</th>
<th>Exports value (EUR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SIEC E7000</td>
<td>Electric power</td>
<td>3,028 GWh</td>
<td>n/a</td>
</tr>
</tbody>
</table>

**Source:** based on Eurostat ‘EU trade since 1988 by HS2,4,6 and CN8’ [DS-645593], and ‘Imports of electricity and derived heat by partner country [nrg_ti_eh]’