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Carbon Border Adjustment mechanism

Submission

October 27th, 2020



pwc

The European cement industry will be key to the Green Deal and EU economy provided the industry is able to make significant investments

The cement industry is key to the European economy



- 200** plants
- 180 m tons** produced
- 135,000** Total jobs
incl 35,000 direct jobs
- 2.8** Multiplier effect in the EU Economy
- Key applications** in
Construction, Energy and Transportation
- Role in circular economy**

The EU Green Deal needs cement contribution to succeed

“

Cement [is] indispensable to Europe's economy, as [it supplies] several key value chains.

EC Green Deal

Construction



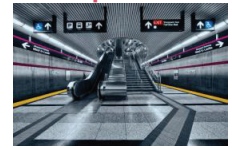
Cement enables to build **zero-emissions / negative emissions buildings** thanks to high isolation standards

Energy



Most **low-carbon energy generators need cement in their construction process**: wind mills, water dams, cogeneration and hydrogen plants etc...

Transportation



Public mass transportation in cities (subway, tramways) as well as rural areas (railway incl. high speed) **need cement**

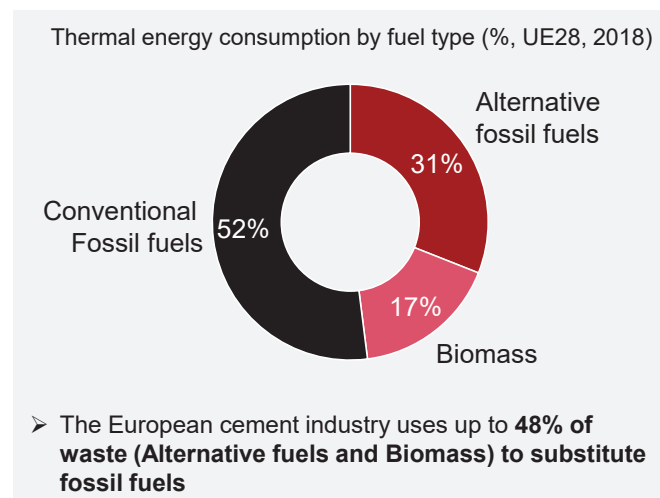
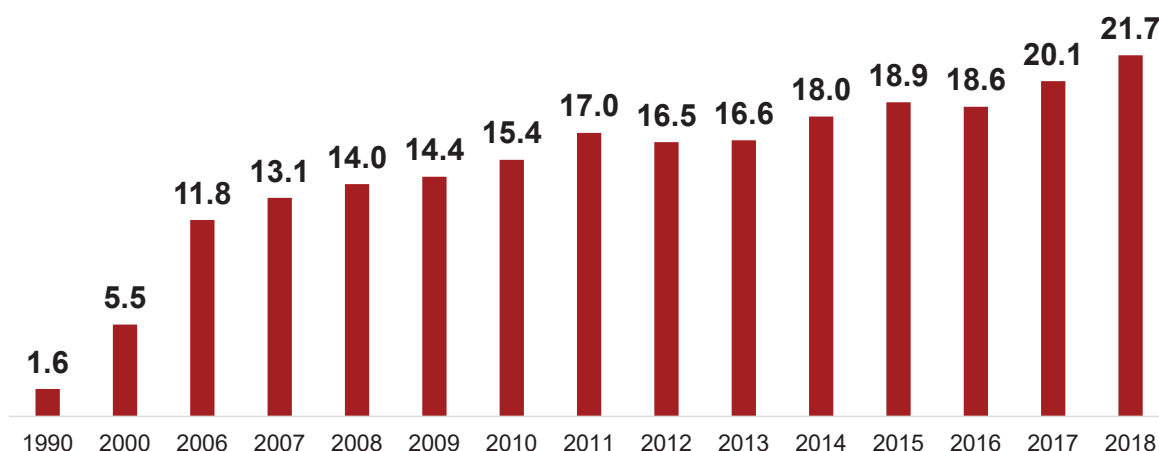
Positive impact of the industry on social well-being through construction of hospitals, schools

The **cement industry will be key to achieve the EU Green Deal** as it contributes to critical steps in the wider ecosystem of construction and energy. However, this significant contribution to the EU Green Deal can be achieved only if:

- The cement **full value chain remains in the EU** in the coming years
- **Cement plants** keep being present **across all EU territories**, fully aligned with the local construction industrial ecosystem

The European cement industry's increasing role in the circular economy will also be key to the Green Deal

CO2 emissions avoided through the use of non-recyclable waste and biomass waste to replace fossil fuels (MT, EU28, 1990-2018)



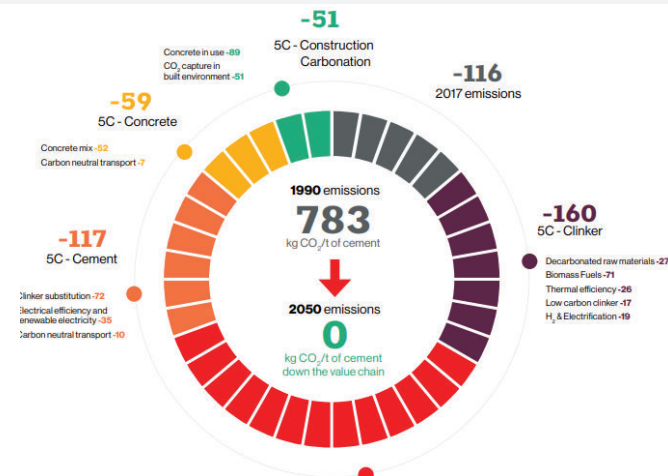
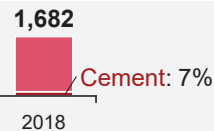
- The European cement industry plays a **key role in the circular economy by increasing the European capacity to value waste**
- Indeed the European cement industry has significantly improved its energy consumption over the past decade, reaching **48% of thermal energy from alternative fuels in 2018** versus 22% in 2008
- As a result **22 millions tons of CO2 were not emitted in 2018**, representing a **+55% saving increase compared to 2008**

After large improvements in CO₂ emissions, the cement industry needs a level playing field to be able to finance decarbonization investments

The EU Cement industry is willing to achieve full decarbonization by 2050 (CEMBUREAU Roadmap)

Since 1990, the EU cement industry has reduced CO₂ relative emissions by ~15% and is targeting 0 emissions by 2050.

Current share of cement industry out of EU ETS stationary installations direct emissions (MT, 2018)



Carbon Border Adjustment mechanism Strategy&

Source: EU Green Deal, EC, GNR, CEMBUREAU, PwC Strategy& Analysis

The sector decarbonization needs significant investments, enabled by viable business cases in the EU

The CEMBUREAU Roadmap addresses the technology and innovation levers the industry is focusing on to reduce its CO₂. **The industry needs to invest heavily in breakthrough technologies** on its path to achieving carbon neutrality.

It is of crucial importance that these investments can take place in a competitive environment which is not distorted by factors that weigh unequally on European producers and third country producers

Previous ETS periods were designed to **reduce the risk of relocation through free allowances** but not at the imports of carbon intensive products into the EU

A Carbon-Border Adjustment Mechanism (CBAM) can effectively prevent the import of carbon-intensive products and establish a **level playing field between EU and 3rd countries**

The co-existence of free allowances and CBAM will meet the two objectives and ensure EU players are able to fund decarbonization investments

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As ETS phase IV (2021-2030) impacts are significant, introducing CBAM in addition to free allowances is key to ensure full contribution of the sector to the EU Green Deal



ETS phase IV will result in increased carbon costs for the industry,

- Under current ETS phase IV forecasts, **carbon costs of the cement industry would reach up to [REDACTED] representing up to [REDACTED]** (as a comparison, domestic prices EU28 average is set at [REDACTED] in 2019).
- A **large portion of the EU territory would be suffering from high carbon leakage** as importers would be more profitable than domestic players.



Carbon leakage will be exacerbated by ETS phase IV, with significant effects on jobs and CO2 emissions*

Aggravated carbon leakage would have the following impacts:

- **Closures of plants and jobs destructions** [REDACTED] jobs in the EU28) and additional CO2 emissions (+4.5 million tons in 2030) as plants are relocated outside the EU
- **Inability for EU cement players to finance the decarbonization investments** necessary to achieve the CEMBUREAU 2050 roadmap



A well-designed Carbon Border Adjustment Mechanism should establish a level playing field, enabling a viable business case for decarbonization investment

- An efficient CBAM would be designed as a **tax applied to imports, covering direct and indirect CO2 costs and applicable to all 3rd countries**.
- A specific CO2 charge exemption can be designed to pay back carbon costs for export products as part of CBAM

Only the co-existence of CBAM and free allowances can ensure the long-term viability of the European industry and its future contribution to the Green Deal

EU ETS with free allowances provides investment framework for companies until 2030 and it is therefore essential it remains in place

- Cement companies have set out ambitious CO2 reduction plans aiming at carbon neutrality along the value chain by 2050
- The investments needed need to be decided in long-term investment cycles (30-40 years)
- Therefore, predictability is key

Surging imports in the EU coupled with capacity build-up at EU borders brings in clinker and cement not subject to CO2 constraints

- Capacity utilization in neighbouring countries between 40%-60%
- Doubling of imports in the EU
- Uneven costs because of CO2 imposed on EU producers

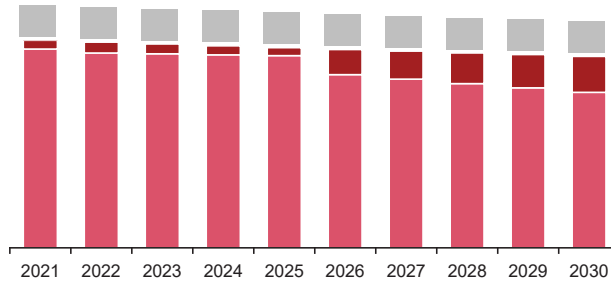
CBAM will be able to successfully address imports from third countries with no carbon constraints

Free allowances and a well-designed CBA can co-exist to take both aspects of carbon leakage and allow EU companies to invest in carbon neutrality

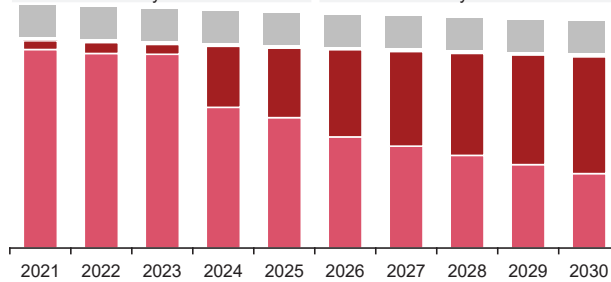
As free allowances decrease in the ETS phase IV period, the EU cement players are to pay increasing carbon costs (up to €Bn 5.3 in 2030)

Emission ratio and free allowances (kgCO₂/t clinker)

EU direct emission ratio Free allowances



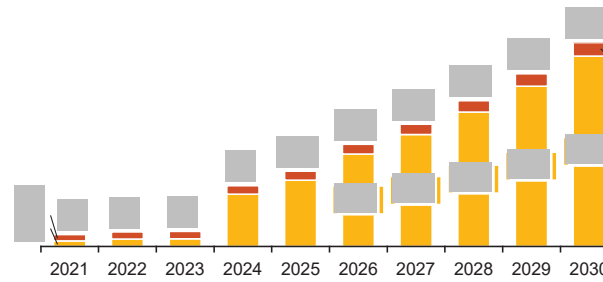
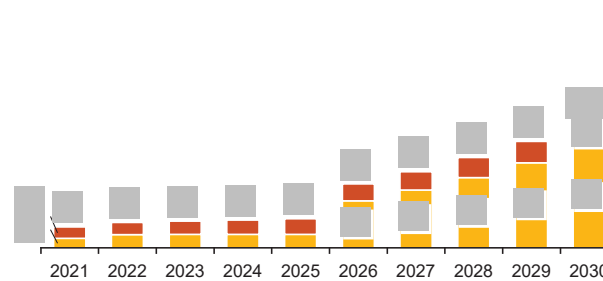
2021-25: FA calculated with benchmark of 707 and production historical activity level of 2014-18
2026-2030: FA calculated with benchmark of 688 and production historical activity level of 2019-23



CEMBUREAU roadmap and expected benchmark evolution

Total carbon cost (€/t cement)

Direct emissions Indirect emissions



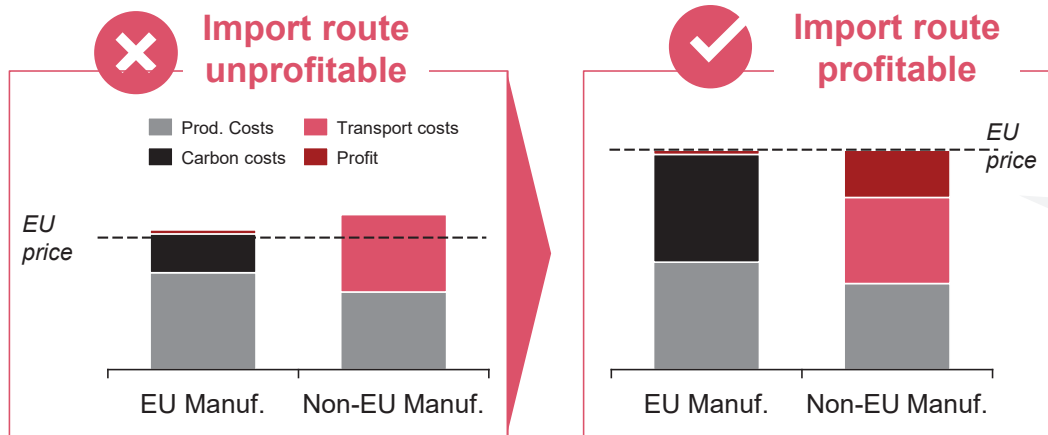
Carbon costs based on linear increase of 30 to 80€/tCO₂ to achieve Paris agreements

With the forecast ETS phase IV period, **the carbon costs of the cement industry would reach up to [redacted]** (as a comparison, domestic prices EU28 average is set at 75.2€/t in 2019).

EU manufacturers are weakened by increased carbon costs as non-EU players are not charged similar regulation costs.

EU players are increasingly less competitive than non-EU players on domestic and international markets.

As import routes are increasingly profitable, production and capacities are relocated outside the EU, increasing carbon leakage



Following carbon costs increase, **manufacturers from 3rd countries will become profitable on the EU territory.**

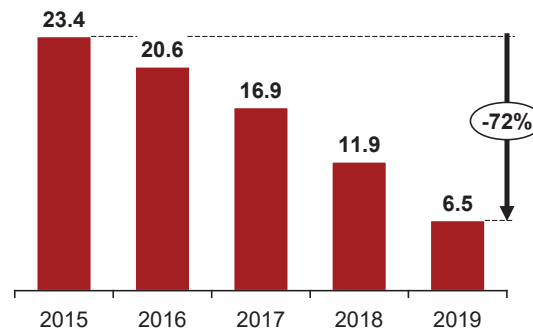
This leads to **carbon leakage**: increasing imports and decreased exports on international routes unless specific mechanisms are implemented.

Considering total costs, only a fraction of the EU28+EFTA territory are facing carbon leakage today. However, some non-EU countries benefit from significant overcapacities; considering variable costs it is already profitable to export to the EU

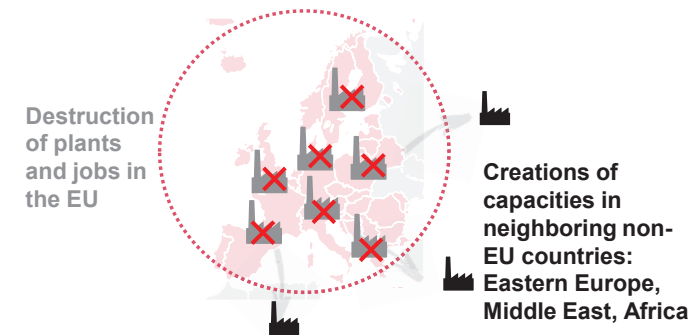
Analyses include both cement and clinker:

- Depending on the product most imported per country, routes were modelled shipping either cement or clinker

EU28 net trade balance of cement (MT)

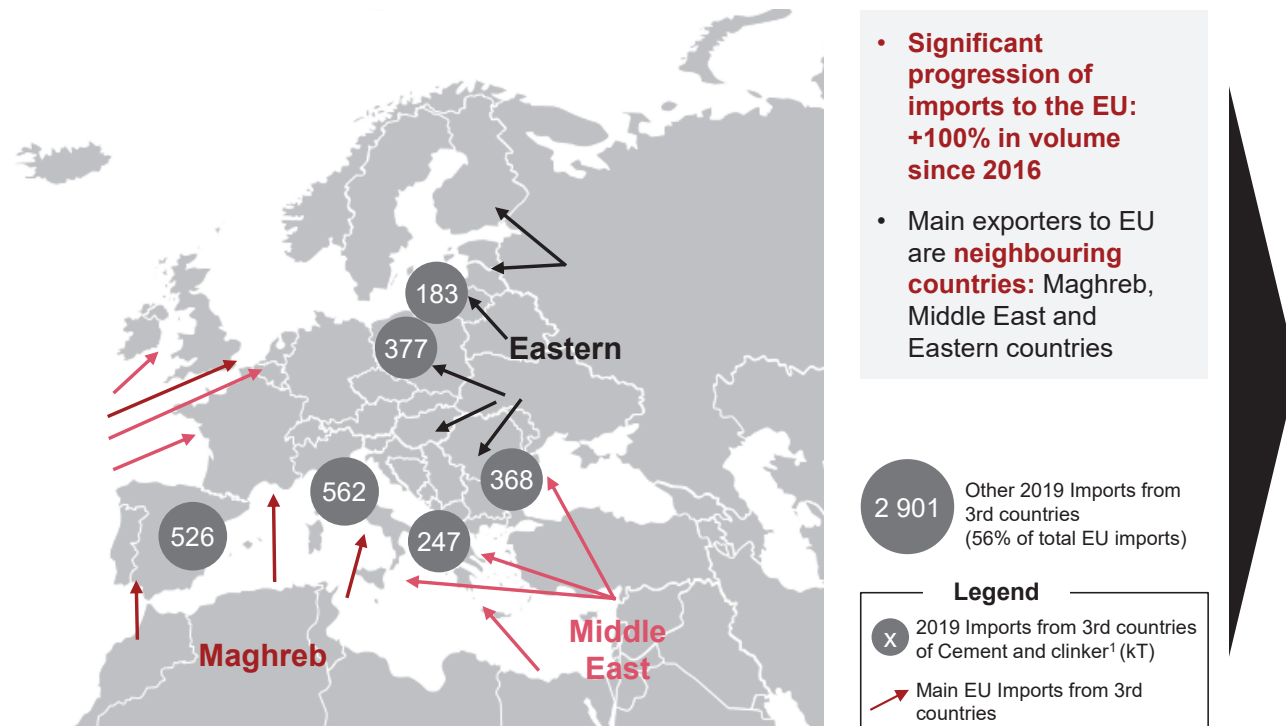


Potential future trends in cement manufacturing



Carbon leakage impact is reinforced by third countries increasing their capacities at EU borders

Main imports volume and routes from 3rd countries into the EU (kT, 2019)



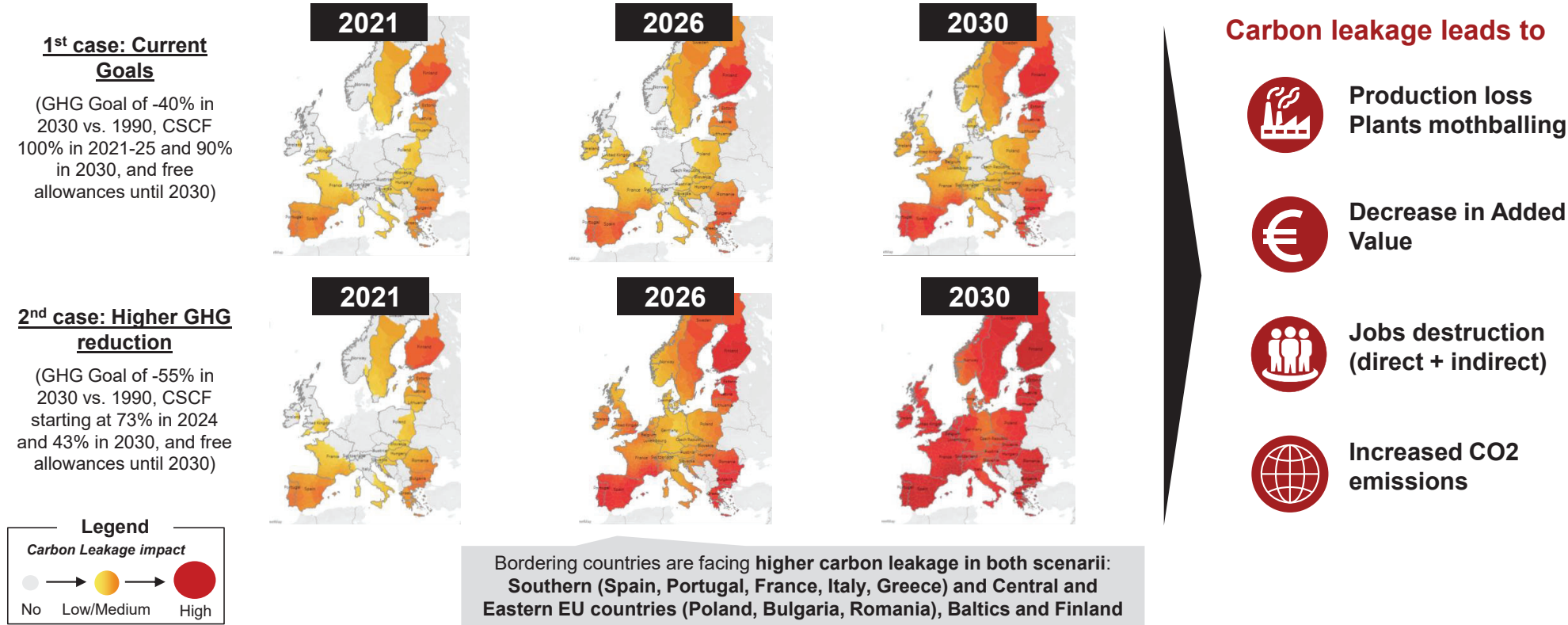
Carbon leakage impact is expected to worsen in the next years:

- Neighbouring countries **built capacities to export more** to the EU
 - 70MT increased capacity** in third countries between 2018 and 2025, representing c. 35% of EU yearly total production
- New business model are being set up: increased grinding capacity** across EU close to borders for import of clinker
- EU ports have capacity to import** clinker and cement
- Neighbouring countries **are incentivized to export because of their low costs**
 - Current capacity utilization is 40% to 60%:** third countries cover their fixed costs and export on variable costs

(1) Cement products refer to NACE code 2351 regroupes aluminous cement, blast furnace cement, cement clinkers, cement (whether or not coloured, excl. portland cement and aluminous cement), cement (whether or not coloured, excl. portland cement, aluminous cement and blast furnace cement), portland cement (excl. white, whether or not artificially coloured) and white portland cement (whether or not artificially coloured)
Source: Eurostat, PwC Strategy& analysis













A large portion of the EU territory will be facing an exacerbated carbon leakage by 2030 as EU manufacturers carbon costs keep increasing

Carbon leakage impact for the cement industry (2021-30)



CBAM provides an opportunity to reduce overall CO₂ emissions and support decarbonization of the EU economy

Impacts of carbon leakage (EU28, 2030)

Scenario	Year	 Production (mT)	 # Total Jobs	 CO ₂ Emissions suppl. (kT)	Sites
Actual	2019	193 ⁽¹⁾	~135 000 <i>(incl. 35,000 direct)</i>	120,000	200
1 st Case without CBAM	2030			+2,200	
2 nd case without CBAM	2030			+4,640	
1 st Case with CBAM	2030			+900	

Even in case of a CBAM, the EU cement industry is still facing carbon leakage due to price and costs trends in the EU



- The CBAM can only preserve jobs and plants in case it is **designed to effectively mirror carbon costs supported by EU players**
- The CBAM should be applied as soon as possible to **help maintain capacities in the EU and sustain necessary decarbonization investments** for the implementation of the CEMBUREAU roadmap (0 emissions by 2050)

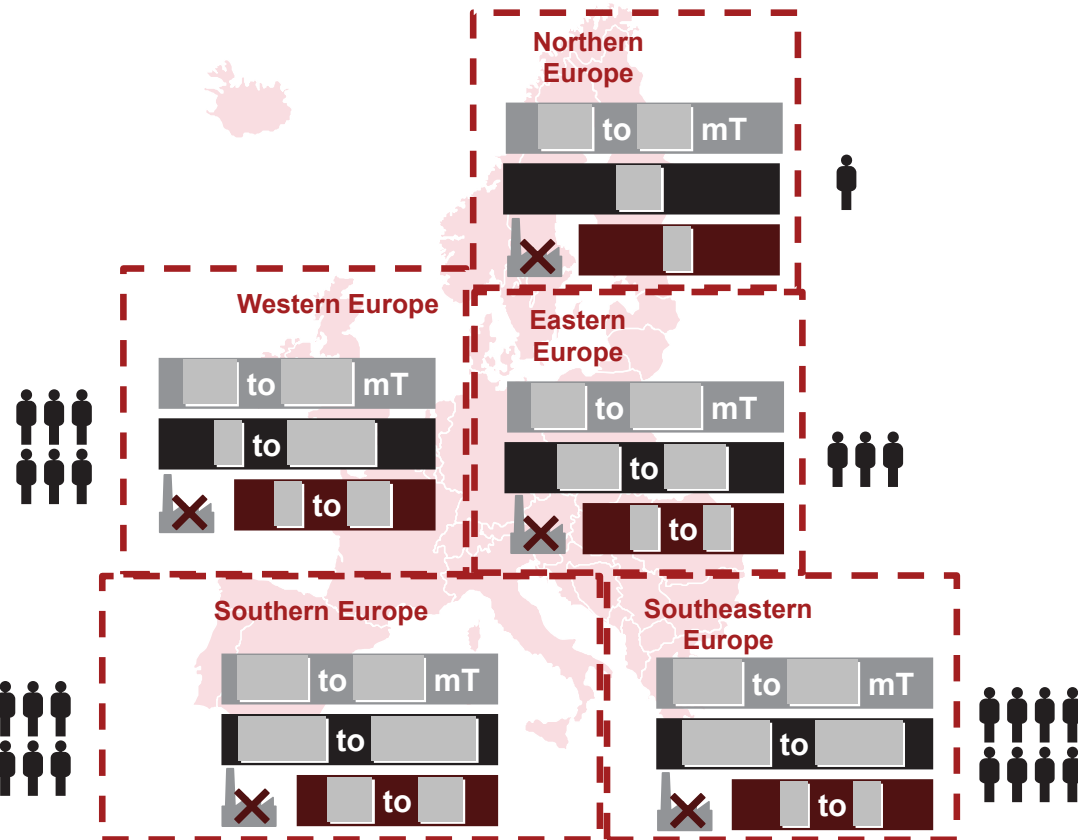
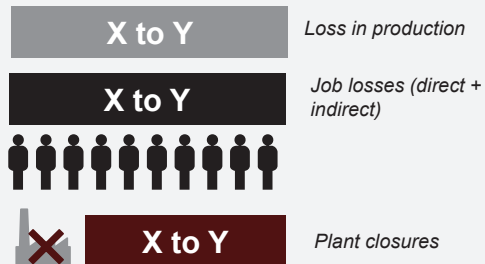
Without a CBAM, the carbon leakage will hit particularly the Southern and Southeastern European economies, resulting in jobs losses

Estimated impacts in jobs, production and sites (2030, 1st case and 2nd case)

Scenario used in modelling:

- CO2 price (t/€): 30-80
- GHG Red. Goal: -40% (1st case) and -55% (2nd case)
- Base CSCF Factor: 100% (1st case) and 78% (2nd case)
- Free allowances until 2030

Figures presented by geographical zone (impact from 1st case to 2nd case)



The CBAM design as a carbon tax enables operational and legal enforceability in the short run to effectively mitigate carbon leakage

Potential CBAM designs

Most likely options

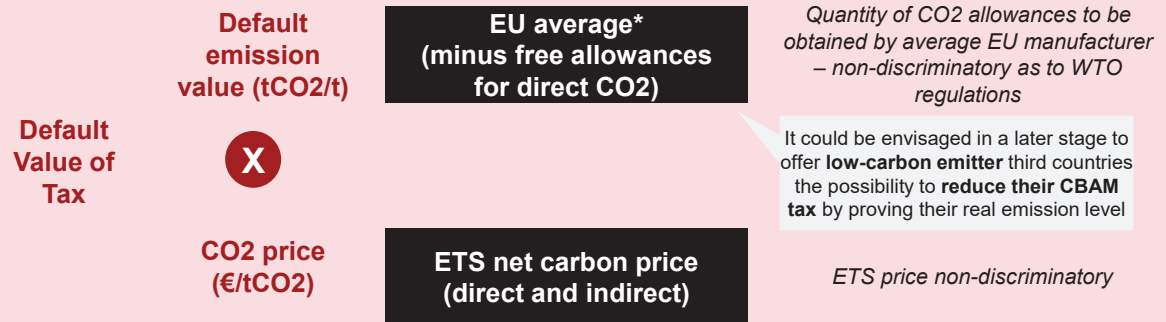
Tax applied on imports	<div>✓</div> Operationally and legally enforceable (WTO regulations) <div>✗</div> Doesn't cover exports Mechanism to be carefully tailored with WTO regulations
Mirror ETS System	<div>✓</div> Safeguards the ETS system from disruptions and covers imports <div>✗</div> Complex to implement (# of allowances, controls outside the EU)
ETS Inclusion	<div>✓</div> Equal conditions for EU and non-EU manufacturers <div>✗</div> Complex to implement (# of allowances, controls outside the EU)
Consumption Charge	<div>✓</div> Covers imports and exports Enables monitoring of carbon price <div>✗</div> Complex to implement (including setting of base charge)

Proposed CBAM for imports (see exports p15)

The CBAM would have the following characteristics:

- **Format:** Tax applied on imports to the EU or Mirror ETS system
- **Scope:** Direct and indirect emissions
- **Differentiation:** the default value of tax applicable for all 3rd countries matches the WTO compatibility without recourse with GATT Article XX. In case countries / plants are able to claim reduced tax due to lower emissions or existing carbon trading schemes, a differentiation could be implemented if in-depth and independent audits of the specificities of each are performed

Such a design would ensure the tax accurately mirrors the carbon costs supported by an average EU manufacturer.



The default carbon tax would be paid by any importer when products are shipped into the EU territory, with conditions similar to duties paid to Member States customs. It covers imports only.

A CBAM would limit the carbon leakage costs on the EU territory in all scenarios but borders of the EU would still be impacted

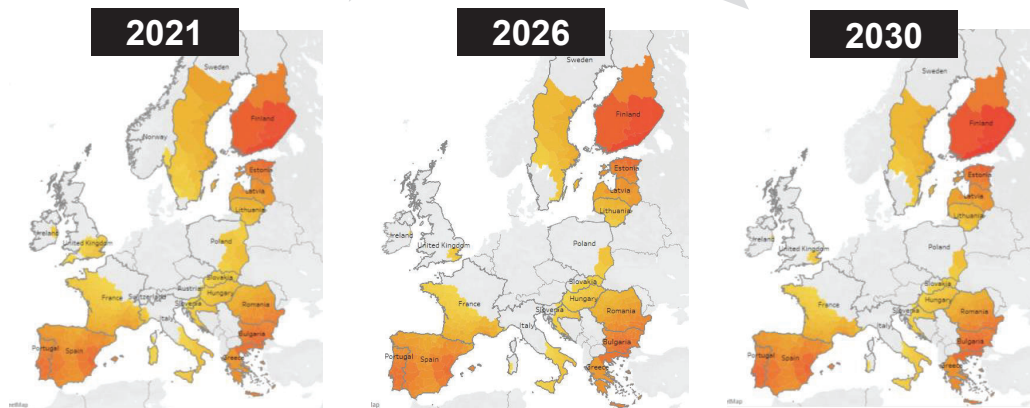
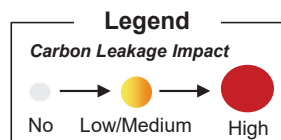
Carbon leakage impact for the cement industry with a CBAM (2021-30)

As the CBAM is designed to cover the EU manufacturer carbon costs, the **carbon leakage is similar across scenarios**

The modelling supposes the **CBAM is implemented from 2023 on**

As the CBAM is by design applied via an equivalent amount to EU average costs, **the carbon leakage wouldn't evolve across time** despite increase in carbon costs

1st and 2nd Cases



A CBAM would safeguard by 2030:

- **jobs** (direct and indirect)
-

The CBAM would mirror the EU manufacturers average carbon costs, building a **level playing field between EU and non-EU manufacturers**.

As such, the CBAM would have positive impact on jobs, CO₂ emissions and production in the EU.

However, the CBAM should be implemented **as early as possible to prevent plants closures and help EU players finance decarbonization investments**.

It could be envisaged in a later stage to offer **low-carbon emitter third countries the possibility to reduce their CBAM tax** by proving their real emission level.

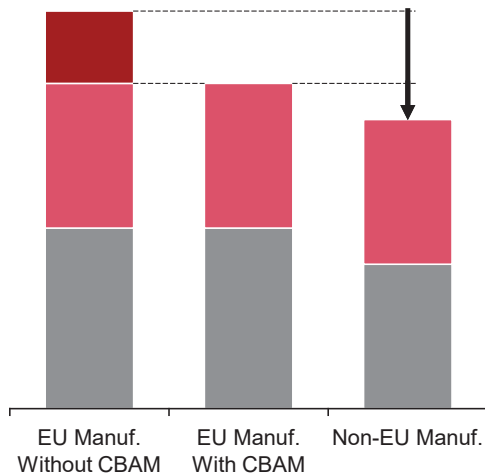
A specific CO₂ charge exception can be designed to pay back carbon costs for exports products as part of CBAM (similar process as VAT in Europe)

Proposed CBAM scheme (illustrative)

■ Carbon costs
■ Transport costs
■ Prod. Costs

Without CBAM, the non-EU manufacturer doesn't support regulation / carbon costs as the EU manufacturer.

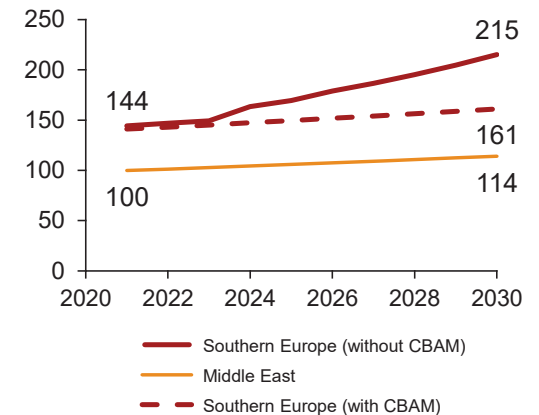
The non-EU Player is more competitive due to the EU ETS on export markets.



CBAM for exports: paying back carbon costs to exporter

- The EU is mainly exporting from Southern Europe to Northern America and Africa but **EU players are losing ground to non-EU manufacturers**, especially in the Middle East
- A CBAM would have the **EU pay back actual carbon costs to the manufacturer / exporter** (average for the previous year) when leaving the EU territory
- The CBAM should include total costs (direct + indirect) for all ETS sectors.
- As for the CBAM design, this CO₂ charge exception for exports would co-exist with free allowances, i.e. pay back the carbon costs which are paid on top of benchmark

Production costs of export cement to Northern America (Index 100, 2021-30)



The competition distortion on export could be responsible for up to job losses and ~ 450 ktons of additional carbon emissions in 2030

Estimated impacts on exportations in jobs, plants and CO2 emissions
(2030, 1st case and 2nd case)

Scenario used in modelling:

- CO2 price (t/€): 30-80
- GHG Red. Goal: -40% (1st case) and -55% (2nd case)
- Base CSCF Factor: 100% (1st case) and 78% (2nd case)
- Free allowances until 2030


Figures presented by geographical zone (impact from 1st case to 2nd case)

X to Y

Additional CO2 emissions due to carbon leakage (thousand tons)

X to Y

Job losses (direct + indirect)

 X to Y

Plant closures

The figure is a map of Europe divided into three geographical zones, each with associated data for the impact from the 1st case to the 2nd case in 2030. The data is presented in three categories: Additional CO2 emissions (thousand tons), Job losses (direct + indirect), and Plant closures.

Geographical Zone	Additional CO2 emissions (thousand tons)	Job losses (direct + indirect)	Plant closures
Western, Northern and Eastern Europe	X to Y	X to Y	X to Y
Southern Europe	X to Y	X to Y	X to Y
Southeastern Europe	X to Y	X to Y	X to Y

Carbon Border Adjustment mechanism
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Source: Eurostat Comext, Eurostat Prodcom, PwC Strategy& Analyses

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Even with a CBAM, investment leakage remains and industry requires assistance on its path to carbon neutrality

In the short term

- It is very important to **stabilize and give visibility to the investors** so that they can make the **investment expected in the roadmap to support decarbonization**
- To follow the roadmap, investments should be decided rapidly, therefore the European industry needs a **pragmatic framework defined at the beginning of ETS phase IV**
- Investments will have regard to: (i) financing for breakthrough technology innovation; (ii) use of revenue from the tax for assisting the path to carbon neutrality for industry ; (iii) new financing models such as contracts for difference

In the medium term

- Need for **new mechanisms** such as the **consumption charge**: they may be **more complex** but would have a **more durable and less trade conflictual character**
- CEMBUREAU is keen to discuss the design of such future mechanisms **with the European Commission in the future**

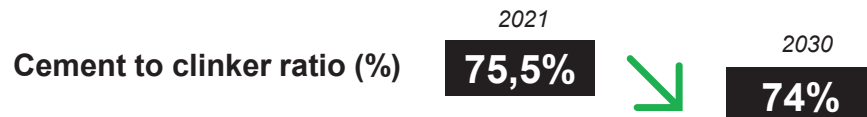
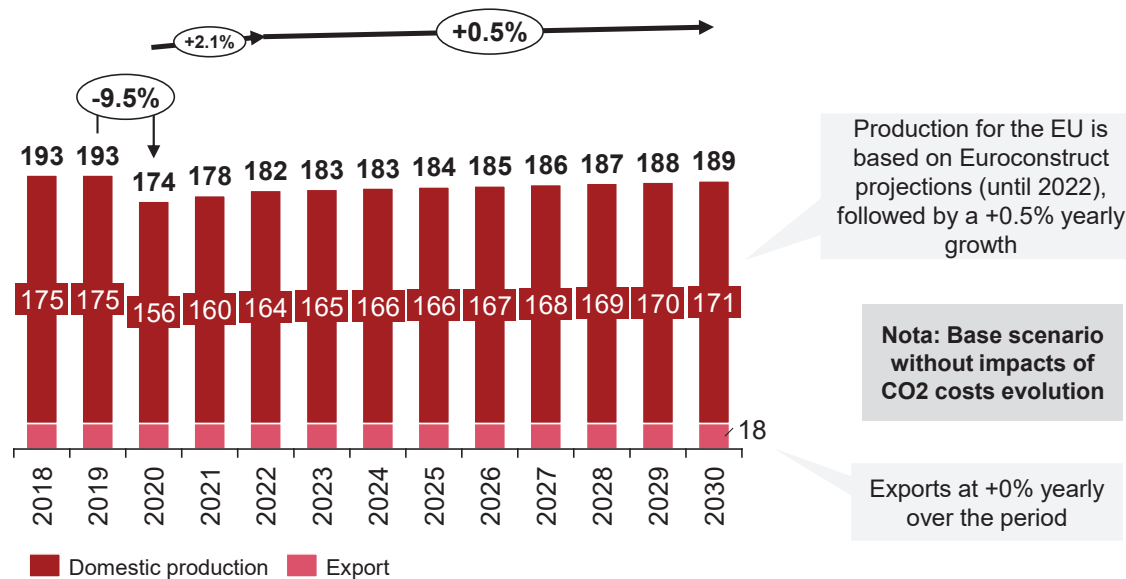
- Back-up slides (key hypotheses used in modelling)



Several hypotheses (cement production, emission ratios) have been used to modelized carbon costs evolution in the ETS phase IV period



Cement production in Europe (in million tons)



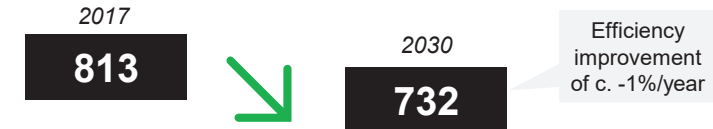
Carbon Border Adjustment mechanism
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Nota: for some analyses such as actual direct emissions, data exclude Iceland and Liechtenstein
Source: Cembureau, GNR data, PwC Strategy& analysis



CO2 emissions of production

Direct emissions ratio (kgCO2/t clinker)



Benchmark ratio (kgCO2/t clinker)



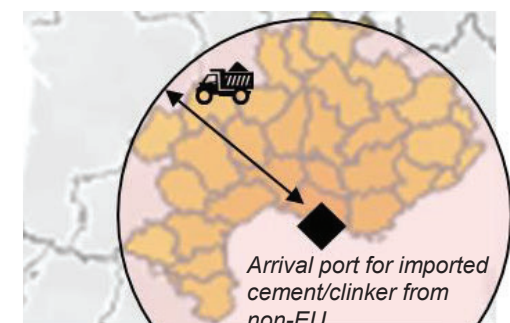
Indirect emissions ratio



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The carbon leakage impact is assessed based on the profitability of importers of 3rd country products in each EU region / plant

Illustration of profitability analyses



Area in which local market is penetrated by imported products

Import routes

Illustration :

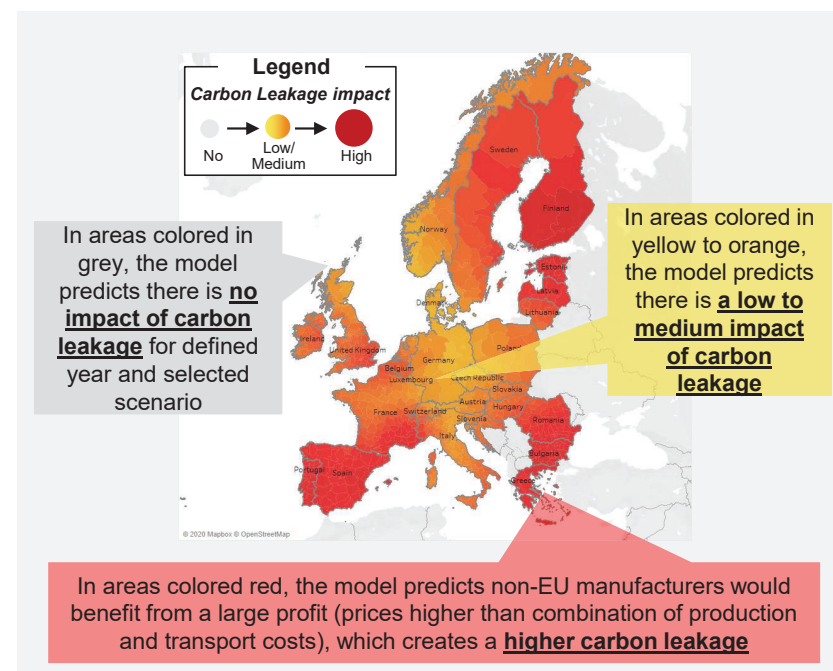
- Non-EU importer has a potential 10€ profit when unloading in EU port (Profit = Domestic local price – importer's production and transport costs)
- 10€ is the transport cost for 100km
- Potential areas impacted by carbon leakage are the territories 100km distant from Eu port (colored regions)

The carbon leakage impact has been assessed based on a selection of trade routes based on past and existing trade patterns.

Modelled import routes

- Maghreb → Southern Europe
- Middle East → Southern Europe
- Middle East → Western Europe
- Non-EU Eastern → Eastern Europe

Heatmap of carbon leakage impact



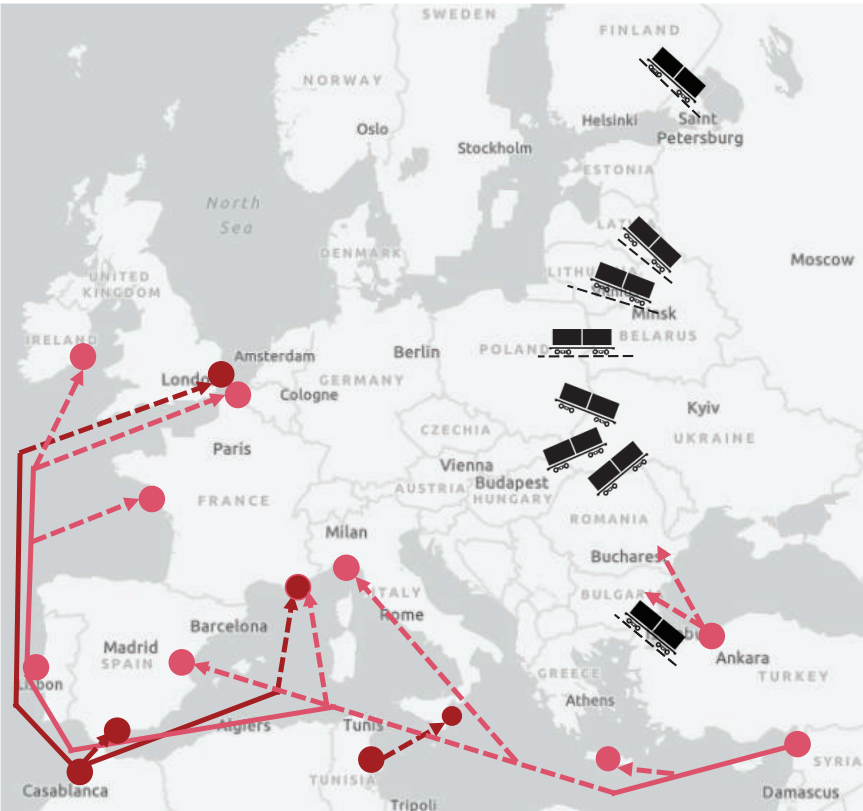
A selection of ~20 imports trade routes has been analysed, based on current trade patterns and potential new routes

Selection of trade routes (3rd countries to the EU) for heatmap modelling



Seaborne imports

From	To	Product
Morocco	France, South East	Clinker
Morocco	UK, South East	Clinker
Morocco	Spain, South	Clinker
Tunisia	Italy, South	Clinker
Middle East	Ireland, West	Clinker
Middle East	France, South East	Clinker
Middle East	France, West	Clinker
Middle East	Spain, East	Clinker
Middle East	Spain, East	Cement
Middle East	Portugal, West	Clinker
Middle East	Portugal, West	Cement
Middle East	Belgium, North	Clinker
Middle East	Italy, North West	Clinker
Middle East	Greece, Islands	Cement
Middle East	Bulgaria, East	Cement
Middle East	Romania, East	Clinker



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Note: Includes current trade routes and potential future trade routes
Source: Eurostat Comext, CEMBUREAU members, Strategy& Analysis



Land imports

From	To	Product
Belarus	Latvia, South	Cement
Belarus	Lithuania, South East	Cement
Belarus	Poland, East	Cement
Ukraine	Poland, South East	Cement
Ukraine	Romania, North	Cement
Ukraine	Hungary, North East	Cement
Middle East	Bulgaria, South East	Cement
Russia	Finland, South	Cement

The impacts (carbon leakage and associated externalities) have been modelled based on importer profits compared to EU producers

Importer profit analysis to determine impact on plant

Domestic price is assumed to increase similarly to domestic costs (conservative option as manufacturers might not be able to pass through all costs)

For all regions and plants in the EU, the profit has been computed to **determine if the region/plant is impacted by carbon leakage** (cf. heatmap)

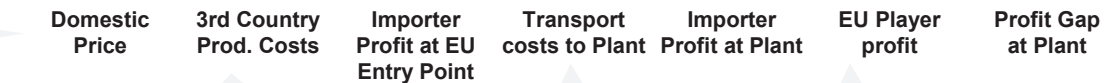


Modelling takes into account dynamic pricing as EU players are incentivized to reduce price (to the detriment of profit) to sustain volume / capacities until their own profit reaches 0.

When profit gap is significant, it leads to the capture of market shares by the importer. It could lead to a plant closure when minimum capacity utilization is reached.

The impacts on production, GVA and evolution of CO2 emissions has been computed.

Eurostat data



Experts interviews and public data

Experts interviews and public data

Eurostat data