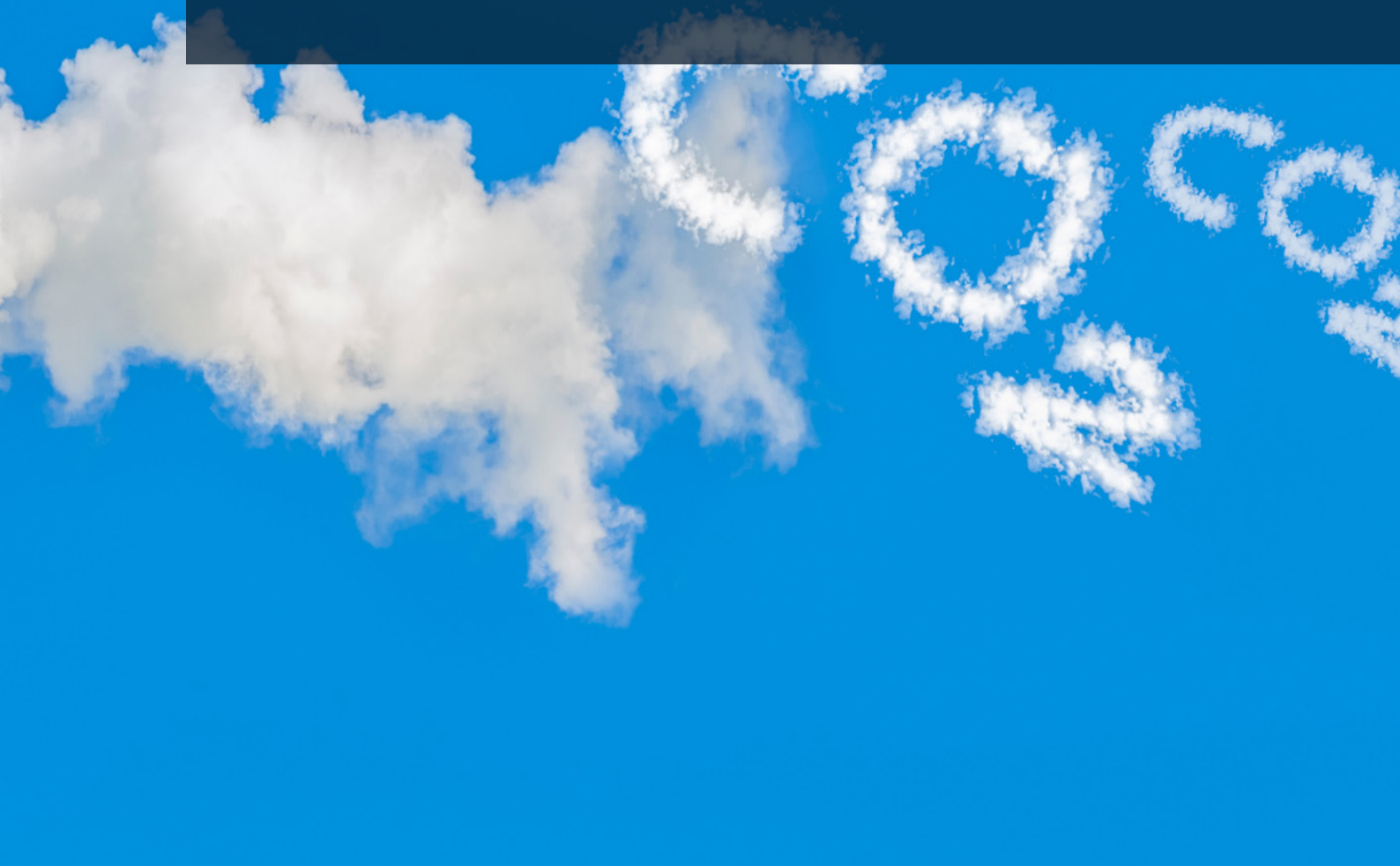
BELLONA EUROPA

Making a Difference in European Carbon:

fitting in a CBAM to support heavy industry transformation

July 2021



Disclaimer

Bellona endeavours to ensure that the information disclosed in this report is correct and free from copyrights but does not warrant or assume any legal liability or responsibility for the accuracy, completeness, interpretation or usefulness of the information which may result from the use of this report.

© 2021 by the Bellona Foundation. All rights reserved. This copy is for personal, non-commercial use only. Users may download, print or copy extracts of content from this publication for their own and non-commercial use. No part of this work may be reproduced without quoting the Bellona Foundation or the source used in this report. Commercial use of this publication requires prior consent of the Bellona Foundation.

Authors:
Adam Whitmore, Reinout Deberg, Suzana Carp

Contributors:
Ana Serdoner, Keith Whiriskey, Marta Lovisolo, Jonas Helseth

Design and Layout:
Rebecka Larsson

Executive summary

With its European Green Deal, the EU decisively set out on the journey to uphold its global climate commitments under the Paris Agreement. It aims to both pave the way and bring others along in enabling humanity to halt disastrous climate change. The cornerstone of this agenda is the EU's goal to achieving net zero greenhouse gas emissions by 2050, implying that every sector of the economy needs to undergo a profound transformation in the next three decades and get to near zero carbon emissions as soon as possible.

To date, heavy industry has been largely outside the scope of targeted EU decarbonisation measures, and whilst most related sectors are part of the EU ETS, so far they have been allocated emission allowances for free, as to protect them from unfair competition from jurisdictions without any penalty on dumping CO_2 in our atmosphere. The EU Climate Law and the higher 2030 emissions reductions target mean that the EU ETS has to be greatly enhanced to deliver its fair share of the new, more ambitious, 2030 target.

The free allocation of allowances under the EU ETS is unsustainable and finds itself on a much faster downward pathway, leaving a huge question mark for how industry will finance innovation after 2030. This report shows there will simply not be enough allowances left to cover industrial emissions at the current levels. **EU industry is faced with emission pricing uncertainties while attempting to raise finance at the actual scale required for new investments.**

Since 2019, the world has witnessed a virtuous and very rapid increase in net-zero commitments, with more than half of the world's GDP and 131 countries either already covered by such pledges or in the process of discussing and adopting them. Additionally, a race to zero driven by non-state actors has been created in parallel, with companies, cities and regions joining this global effort with their own net-zero pledges, covering more than half of the world's GDP. This development, together with the long investment cycles in heavy industry (20-30 years), effectively means that the previous discourse on carbon leakage is now outdated, if not obsolete.

The old narrative is rapidly being turned on its head by the new global reality: **to retain a strong industrial base, Europe must move from protecting its industry from climate action to protecting those in industry who take ambitious action.**

This report seeks to answer the following question:

Are there reforms to the EUETS that over the next 10 years that can support competitiveness in EU industry while incentivising and developing innovation at scale in line with the new climate targets?

It is **now high time that the EU shifts away from financial schemes that shield from the carbon price to policies that work with the carbon price to generate revenues for investments in decarbonisation technologies and deploy them at scale.** A just transition in the industrial sectors can only occur if planning for decarbonisation is in place, which will require the short term reliance on free allowances to be replaced by long-term planning for mechanisms that will help fund innovation and infrastructure deployment to scale.

Unless early action is taken in industry in Phase IV of the EU ETS adjusting for the new 2030 target means that **more than 60% of all of the allowances will end would end up given to industry for free by 2030**. This in turn will leave an ever less auctioning revenue that could have been used to enable industrial deep decarbonisation. The EU would be faced with a wasted decade for industrial decarbonisation, risking that the net-zero by 2050 goal of the EU becomes unattainable.

For the next decade, **the priority order needs to be reversed from avoiding emissions pricing**, which jeopardises the very possibility of a just transition in these sectors, **to enabling the EU ETS to generate new revenue streams to match the investment needs.** Doing so would have the **additional benefit of minimising investment risks associated with deploying breakthrough innovations at scale** – this is what ought to be on the mind of industrial and political leaders alike.

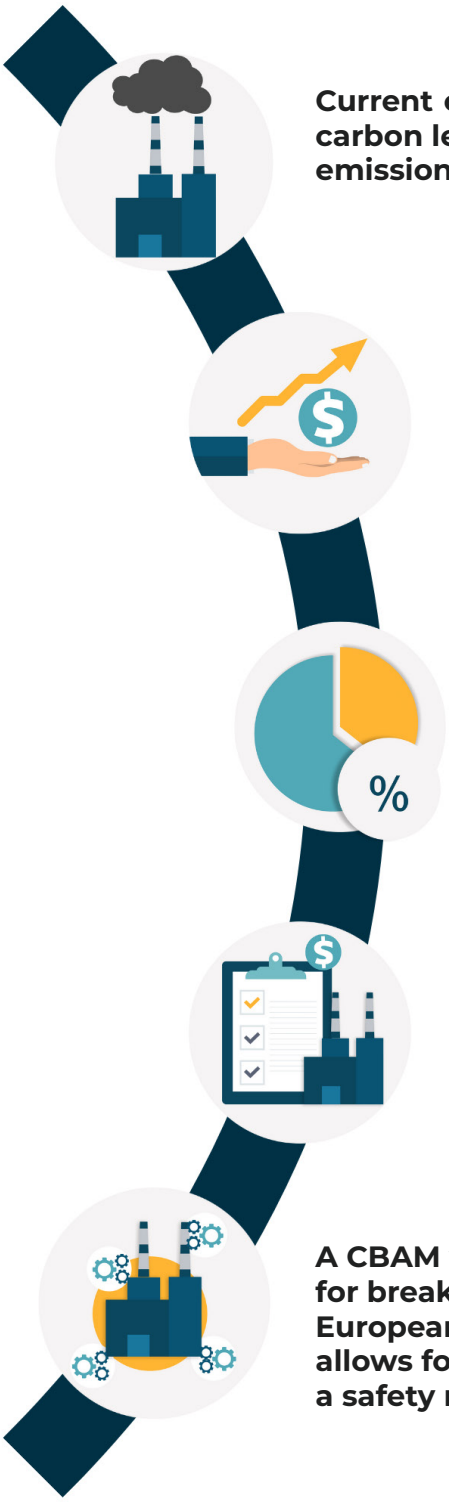
Time is of the essence in terms of striving to limit the greenhouse gas emissions we release into the atmosphere. In order to deliver against the Paris Agreement and address the true scale of the impending climate crises, the EU needs to show leadership by going where no other country has gone yet: pricing its own imported carbon and consumption footprint.

The ability of the EU to bring other countries with it, establish global standards for correct emissions accounting and create funding revenues for its global partners will be the second key point against which the EU Green Deal will have been a success.

The current report identifies the introduction of a Carbon Border Adjustment Mechanism (CBAM) as the single best opportunity for European heavy industry to unlock the necessary innovation funding landscape inside the EU already in the 2020s. This policy innovation, accompanying a phase-out of free emission allowance allocations, would **improve incentives for action to reduce emissions while enabling Europe to raise funds on the real scale needed to support industry in the fundamental transition it must undergo in coming decades** – that of leading in the global innovation race, building the infrastructure for the first climate-neutral continent in the world, all while ensuring a just transition.

In this report, we take a look at one potential mechanism for investing the additional revenues generated by the introduction of a CBAM back into supporting a transformation in Europe's industry with a view of making a tangible difference in reducing its emissions. We use an illustrative example of a fund made up directly from the freed-up allowances, which in the context of this report we refer to as a European Carbon Contracts for Difference fund, recognising this policy mechanism is only one possible option to advance the heavy industry decarbonisation agenda in the 2020s. We chose creation of a dedicated fund to build on the demonstration projects and first-of-a-kind commercial plants developed under the Innovation Fund and provide larger, operational support for the large scale deployment of technologies needed to reduce emissions in energy intensive industries.

Key findings of the report:



Current climate commitments at the global level turn the old carbon leakage narrative into a ‘making a difference in carbon emissions in Europe in the 2020s’ narrative

A CBAM creates a more stable investment climate inside the European Union for investments in heavy industry sectors than continued reliance on free allocation of EUAs

Unless a CBAM is introduced and Free Allocation reduced correspondingly, free allowances will make up more than 60% of the allowances under the cap by 2030 (if the CAP is fit for the new EU 2030 target)

The introduction of a CBAM open up substantial possibilities for the EU ETS to actually provide the level of investment and the guarantees on investments needed for heavy industry decarbonisation

A CBAM works well in support of other financing schemes for breakthrough innovation deployment at scale, such as a European Carbon Contracts for Difference fund (or others), as it allows for some of the costs to be passed through and creates a safety net against the fluctuations of the carbon price

Key Recommendations:

The new EU emissions reductions target for 2030 requires the EU ETS to subtantially increase its reductions target from a **–43%** by **2030** to a **–65%**

A CBAM should be introduced as soon as possible in order to minimise divergence in pathways between the EU and the rest of the world.

The EU ETS needs to be amended in line with the new EU Climate Target and the current Linear Reduction Factor increases from **2.2%** to **4.8%** until **2030**.

The introduction of a CBAM should supports the repurposing of the allowances currently allocated for free to heavy industry sectors under the system into a new fund

1 A European Green Deal in a rapidly warming globe

The European Commission President was contracted to make a difference for carbon emissions in the European Union. Following the 2019 elections, in which climate change topped the elections agenda in all but 2 EU Member States, the European Parliament endorsed the Council's proposal for the Commission President on a promise to deliver a European Green Deal. The importance of making a difference to GHG emissions took precedence over all other objectives, as Parliament threatened to use its power to veto the Commission President proposal over a too low level of emissions reductions which the original proposal referred to (only –50% reductions by 2030, deemed unacceptable for a Parliament which had since 2018 endorsed a –55% reductions minimum target recommendation[1]). **The commitment to make a substantial difference to carbon emissions is at the core of the EU Green Deal. It is the single biggest goal against which the Deal's delivery will be measured.**

The EU Green Deal, as first presented on the 15th of July 2019 by current Commission President von der Leyen, took as its starting point the fact that the most pressing challenge Europe is faced with is keeping the planet healthy, which President Von der Leyen in her speech from 16th of July 2019 said was "the greatest responsibility and the opportunity of our times."

In the same speech, came the mention of a Carbon Border Tax as a fundamental pillar of the EU Green Deal package. This followed an acknowledgement that pricing emissions is needed for behavioural change. As part of this, European industry needs to be supported on its way to transforming, in record time, its production to business models that are near zero emissions, compatible with the goal of Europe becoming the first climate-neutral continent in the world by 2050.

1.1 Carbon Border Adjustments – an important policy innovation

Since 2019, the European Carbon Border Tax instrument proposal has grown in its salience in the European public debate and in its overall role within the EU Green Deal package, not least because a recent European Parliament (EP) report from March 2021 endorsed its introduction. The EP recognised the long-term potential and transformational possibilities that such an instrument can bring, which included not only the recommendation to price the EU's imported carbon but also to change the way the rest of the world looks at and accounts for this carbon.

The EP endorsed **a pathway for future change in the way that embedded emissions are factored into climate policies and reporting**, as it recommended the development of methodologies to incorporate a product's full carbon and environmental footprint through a full life cycle analysis and demanded granularity in reporting for emissions including in the area of international transport[2].

Some of this was later picked up by the European Commission which in a leaked document it mentioned a CBAM should seek to cover 'attributed emissions' from simple goods, referring to direct and indirect process emissions, and for complex goods, it recommended the inclusion of embedded emissions of the input materials.[3] **A complete comparison of the new elements brought forward by the CBAM leaked proposal and the EU ETS in its current form, as well as a brief analysis of the elements, can be found in chapter 2. (page 14).**

The Paris Agreement, which the EU Green Deal seeks to deliver on, acknowledges the differentiated trajectories that countries will have to take to reach the goal of carbon neutrality by the second half of the century. In that sense, competition resulting from different approaches for meeting the targets faster is an unavoidable dimension of what is becoming a race to net-zero. While differentiated starting points and responsibility are part of the process, **reducing emissions faster in one place should not be done at the expense of increasing emissions elsewhere.**

Currently, 131 countries have adopted - or are in the process of discussing with a view to adopting - net-zero targets. As is normal with such diversity, there can be two dynamics that unfold: countries either use the excuse that others are moving slower to delay action at home or they create mechanisms to seek to minimise the gap in policies and create global effects of emission reduction policies at home: a carbon border adjustment mechanism is such a tool.

A CBAM is a carbon pricing instrument that seeks to minimise the divergence between countries' diverging trajectories in meeting the goals of the Paris Agreement.

As it stands, there are 64 carbon pricing schemes around the world, covering 45 national jurisdictions plus additional regional ones with different coverages, amounting up to a total of 21.5% of global GHG Emissions.[4] Some are proposing faster reductions for free allocation covering heavy industry emissions than the EU ETS does. There are differences between current carbon pricing schemes. The introduction of a CBAM will work in such a way that encourages innovation to occur inside the EU, as well as beyond it.

Time is of the essence in terms of striving to limit the greenhouse gas emissions we release into the atmosphere. In order to deliver against the Paris Agreement and address the true scale of the impending climate crises, the EU needs to show leadership by going where no other country has gone yet: **pricing its own imported carbon and consumption footprint.**

The ability of the EU to bring other countries with it, establish global standards for correct emissions accounting and create funding revenues for its global partners will be the second key point against which the EU Green Deal will have been a success.

1.2 The need to transition European industry away from free allowances to CBAMs

The EU Green Deal is meant to deliver both the clear signals and the enabling framework for every sector in the EU Economy to be put on the right trajectory for climate neutrality, including heavy industry. Concretely, that means industry needs:

- clear milestones to support the transformation of sectors, with dates beyond which carbon intensive activities would no longer be able to function in the EU
- trajectories to pave a safe landing to the 2050 near zero point;
- enabling frameworks (standards, correct carbon accounting, etc.);
- infrastructure for reduction projects for enabling frameworks;
- financial incentives have to be created to turn this into an opportunity for Europe to leapfrog ahead in innovation and start deploying net-zero technologies at scale.

Heavy industry has been part of the EU's carbon market ever since 2005. This meant that emissions reductions in this sector were not targeted and promoted via more direct regulation, but rather left to the 'market' forces of the EU ETS. At the same time, heavy industry sectors were given free allowances to cover their emissions if deemed susceptible to carbon leakage. This inevitably weakens the principle of letting carbon pricing provide the long-term signal for decarbonisation. Over time the share of sectors covered has been significantly reduced. However, its effect on emissions covered, and therefore free allocation, has been much smaller. This is because the sectors with the largest emissions are still covered (see figure 1).

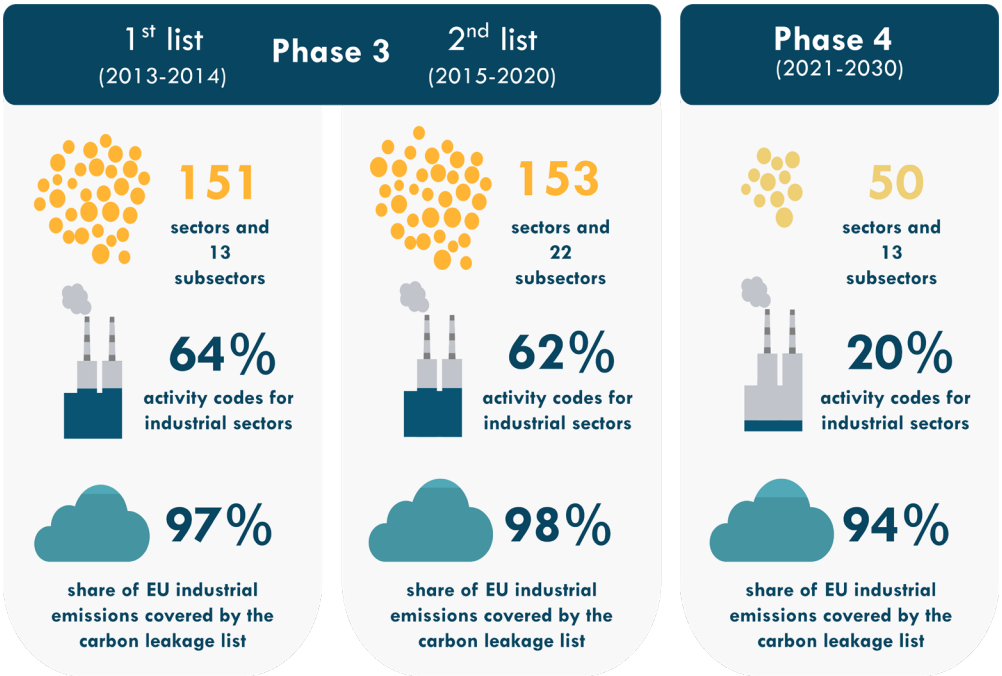


Figure 1: *Reducing the share of sectors covered and its effect on emissions covered.*
Source: *Adapted from the European Court of Auditors Special Report 2020*

Free allocation was introduced as an exceptional transitional measure to full auctioning, which is the default method of allocating allowances as clearly stated in the EU ETS Directive. The measure had to be exceptional, because the polluter pays principle constitutes the legal basis of the EU ETS and is enshrined in the EU Treaties. Therefore derogations from it can only be temporary. From 2005 to 2021, this has translated into **16 years long of a derogation and should the current allocation levels (of 100% to the benchmark) continue to 2030, this would cover the duration of 25 years or a quarter of a century**. To put it in the net-zero perspective, in just as long of a time after 2030, the EU is meant to be close to, if not already at net-zero emissions.

By 2030 free allowances under the ETS would be a quarter of a century old - that's a VERY long time for a temporary derogation

Numerous reports on the effectiveness of free allocation in promoting industrial decarbonisation have been published. The two key concerns raised by those looking into this topic had to do with either: 1) the financial use and magnitude of the freely allocated allowances[5] ; 2) the relationship between this method of protecting against carbon leakage and innovation.[6] This report is concerned with the latter of the two and takes as its departure point the fact that industry emissions between the start point of Phase Three and end point of the same phase did not decrease by more than 2-3%, nor have they been put on a steady pathway to net-zero by 2050.

The European Union's own Court of Auditors published a report less than a year ago which clearly concluded that the effectiveness of free allocation in promoting decarbonisation of the covered sectors was undermined by the full coverage regime. Instead, the same report found that a more targeted approach for the free allocation would have been better from 3 separate perspectives:

1. that of promoting decarbonisation;
2. from the perspective of public finances;
3. and of the internal market (free allocation leads to market distortions).

Furthermore, it concluded that the inclusion of heavy industries in Europe on the carbon leakage list has been done irrespectively of their cost-pass through potential, which resulted in an inefficient approach and "windfall profits".

1.3 Higher ambition requires faster emission reductions to retain competitiveness

The EU was a pioneer in carbon pricing. However, efforts to use carbon pricing to decarbonise industry have fallen well behinds what is needed. Reductions in emissions from industry under the EUETS have been minimal. From 2013 to 2019, they fell by only **2%**, which was in marked contrast to the fall in power sector emissions, which fell **by 28%**.[7] Auctioning of allowances was introduced in the power sector at the start of Phase 3 and likely contributed to this fall.

Benchmarks for industry have been tightened up recently, but at current rates they will still take until:

- 2508 for the sectors which are in the lower bound of the reductions decreasing at 0.2% per year only;
- 2070 for the sectors in the upper bound reducing at 1.6% per year.

Effectively all sectors currently covered by free allocations under the EU ETS are off track for net-zero by 2050. **This is clearly far too little, far too late.**

The EU is even behind current arrangements in other jurisdictions, even those these fall well short of reaching net-zero by mid-century. For example, benchmarks in the California system are already more stringent than in the EU.

The EU ETS is currently off track to deliver its contribution to reaching net zero in the sectors it covers by 2050. Replacing the current free allocation system with CBAMs can help rectify this. The remainder of this report looks at the benefits of CBAMs as part of the policy package.

> ***"There's a feeling I get when I look to the west."***
>
> **- Stairway to Heaven**
> **Led Zeppelin**

1. Case Study - Californication

In California, free allocation for industry is calculated in a different way than in the EU ETS, most notably because free allocation declines annually and benchmarks stay fixed, unlike the EU ETS where free allocation remains constant between 2021-2025 and 2026-2030. Additionally, the Californian system identifies three categories of exposure to carbon leakage list and targets its free allocation accordingly.

There are two different cap adjustment factor trajectories in California. One for activities with more than 50% of total emissions from process emissions, a high emissions intensity and a high leakage risk (e.g. cement) and one for standard activities (e.g. steel production using an electric arc furnace).

Extrapolating known values for 2013-2031, the cap adjustment factor reaches zero in 2084-2085 for sectors like cement and 2048-2049 for sectors like EAF steel production4. This is much sooner than EU ETS benchmarks. Below, two illustrative examples are given to show the difference between the Californian and European method for calculating free allocation.

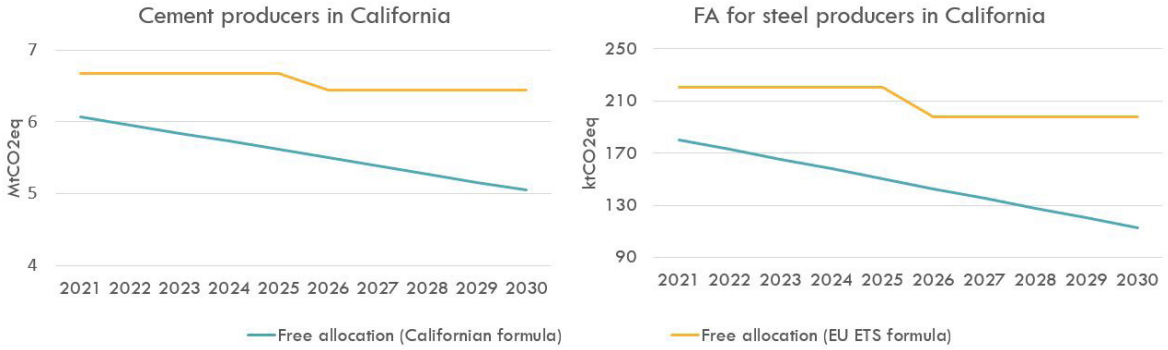


Figure 2: *Comparison of the effect of EU and Californian accounting methodologies on free allocation for Californian steel and cement producers. See Annex I for further details.*

Applying the EU ETS formula for free allocation to Californian industry results in a less ambitious trajectory.

Due to the cap adjustment factor, the Californian ETS reduces the amount of free allowances for industry quicker.

Unlike the EU ETS, where the production data of 2014 to 2018 or 2019 to 2023 is used, in California, they use the actual production data of the year for which allowances are given[1],[2]. During the period 2021-2030, the cap will decline by approximately 13.4 $MtCO_2e$ each year, or about 4% annually on average reaching 200.5 $MtCO_2e$ in 20303. [3]

1 https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program/allowance-allocation/allowance-allocation-industrial
2 https://ec.europa.eu/clima/sites/default/files/ets/allowances/docs/p4_gd2_allocation_methodologies_en.pdf
3 https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems%5B%5D=45

2 Fitting in a CBAM in the Fit for 2030 package

On July 14th 2021, the Commission is expected to table a proposal for a carbon border adjustment mechanism (CBAM) as part of a more comprehensive package of EU climate legislation. The proposal is meant to upgrade the current climate and energy directives to make them fit for them, delivering the newly agreed 2030 target.

A CBAM will impose a charge on imported goods based on their carbon content to limit the risk of carbon leakage[8]. According to a leaked draft, a CBAM will initially cover steel, cement, fertilisers, aluminium and electricity. [9] These sectors already receive about half of all free allowances, which has been the default carbon leakage protection policy option in the European Union since the inception of the EU ETS.

While the leaked draft states that a CBAM will be an alternative to free allocation, concerns regarding double protection and WTO compatibility remain. Article 20, of the General Agreement on Tariffs and Trade (GATT) states that trade measures can be put in place if they are necessary to protect human, animal or plant life or health. Still, they cannot be applied in an arbitrary or unjustifiable discriminatory manner, nor can they be a disguised restriction on international trade.[10] **Reducing free allocation while introducing a CBAM would be the best way to demonstrate no double protection.** It would also be the best for the climate as free allowances that would have gone to steel, cement, aluminium, and fertilisers (further referred to as 'CBAM sectors') can be auctioned. This auctioning revenue can then be used for climate action, for example, in the form of the European fund for carbon contracts for difference (CCfDs), although this is only one option. The report builds on the possibilities of a European CCfD fund as an illustrative example of how much additional revenue for innovation could be generated and how different policy instruments interact with a CBAM in the context of the Fit for 2030 legislative package.

CBAM is directly linked to the EU ETS through the price of its certificates. Thus, anything that affects the price of allowances will also affect the price of certificates. While under the ETS, companies can sell as much of their excess allowances as they want, this is less the case for CBAM (maximum of 10%). This combined with automatic cancelling each year and the absence of banking and trading means importing companies have every incentive not to buy too many certificates. Speculation is therefore highly unlikely within CBAM itself. Both also have a penalty in case of non-compliance. In the ETS it is 100 eur/tCO_2 adjusted for inflation since 2013. For CBAM, the penalty is higher with about 150 euros/tCO_2 assuming an ETS price of 50 euros. To understand more, please refer to the table below (page 14).

EU ETS	CBAM
Allowance = 1 ton of CO_2eq	Certificate = 1 ton of CO_2eq
Auctioned by Member States	Sold by a CBAM Authority
Banking	No banking
Union Registry	CBAM Registry
Price set by the market	Price based on the EU ETS
Covers CO_2, CH4, N2O, HFCs, PFCs, SF6	Same GHGs as EU ETS
EU + Iceland, Liechtenstein and Norway (and linked with the Swiss ETS)	Applies to goods originating outside the EU, Iceland, Liechtenstein, Norway and Switzerland
Trading	No trading
Revenue to Member States	Revenue to the CBAM Authority and the Union budget
Allowances have to be surrendered by 30th of April each year	Certificates have to be surrendered by 31st of May each year
Excess allowances can be sold to other companies	Excess certificates of up to 10% of the originally purchased amount can be sold back to the CBAM Authority.
Allowances can be cancelled by Member States and/or through the MSR.	Excess certificates after surrendering and potential reselling, are automatically cancelled by 31st of July each year.
Free allowances given for sectors at significant risk of carbon leakage.	No free certificates and no export rebates. CBAM certificates to be surrendered shall be reduced in number to reflect the extent to which EU ETS allowances are allocated for free.
Covers electricity and heat generation, energy-intensive industry sectors and aviation	Covers cement, electricity, fertilisers, iron and steel and aluminium
Emissions based on monitored using the appropriate monitoring methodologies set out in Regulation 2018/2066. Covers direct emissions of industry and power sector. Heat and waste gases are relevant for free allocation.	Embedded emissions based on actual or default values of imported goods. Covers direct emissions, indirect emissions (heat, electricity) and corrects for waste gas transfers. Calculation differs between simple and complex goods. Complex goods include embedded emissions from input materials.
Classification of installations based on NACE code	Classification of goods based on CN code
Verification of emissions by an independent verifier	Verification of emissions by an independent verifier
Number of verified emissions publicly available on an installation level	Number of purchased certificates per operator will be confidential
Penalty for not surrendering enough allowances is 100 euro/tCO_2eq, adjusted for inflation. The outstanding number of allowances still have to be surrendered.	Penalty for not surrendering enough certificates is the equivalent to three times the average price of CBAM certificates in the previous year for each CBAM certificate. The outstanding number of certificates still have to be surrendered.

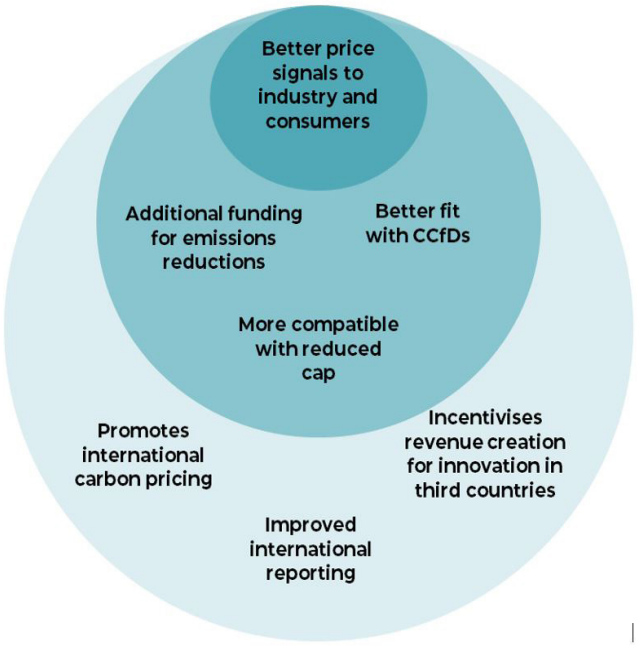
2.1 Benefits of a CBAM

CBAMs have a range of direct and indirect benefits. These include establishing better price signals to support decarbonisation projects than free allocations, enabling some of those costs to be passed through and stimulating market development for low carbon materials, boosting demand and creating a level playing field for them to break through. CBAMs can also complement and enhance the broader package of EU Green Deal measures and make further benefits.

A CBAM can also create a more predictable investment environment for the sort of long-term investments that deep decarbonisation in heavy industry requires. For example, a CBAM could enhance the effectiveness of a European Carbon Contracts for Difference. This is because the free allocation regime is plagued by the uncertainty embedded in its transitional nature.

This means that project investors counting on free allocation to be financing some of their long-term cost could find themselves faced with the possibility that either free allocation disappears entirely overnight (for example, due to litigation or a change in the political environment as climate change effects exacerbate) or simply by their unpredictable decrease (whether it will it be in line with the cap, faster, or slower, is hard to know unless a stable phase-out is projected).

CBAMs additionally generate funding streams for supporting decarbonisation investments, both in the EU and and beyond. By potentially encouraging the introduction or enhancement of carbon pricing in third countries, additional revenues for decarbonisation are raised, which has the potential of changing the nature of climate financing support from the EU.



A part of the revenues raised internally by a CBAM could be used to match the revenues raised elsewhere to double the amounts there and promote decarbonisation abroad.

As such, CBAMs are an essential and valuable component of the overall package of reforms meant to fast forward the sectors currently lagging behind the required trajectory to reach net-zero decarbonisation by 2050. At the same time, they secure the more extensive European Green Deal's role in global efforts to reach the Paris Agreement goal.

2.2. CBAM and Free Allocation

CBAMs have some clear, direct advantages over free allocation. They lead to the carbon price being applied to emissions from the manufacture, both EU production and imports. This leads to more efficient product pricing that reflects emissions costs, in line with the polluter pays principle. This, in turn, creates incentives to reduce emissions during production. It also creates incentives to switch to lower carbon alternative products. These incentives are weaker or non-existent under free allocation. Over time, they could potentially be expanded to incorporate emissions from extraction, use and transport of imports (for example, through the idea of multiple surrendering of carbon permits for one unit of imports).

The transition to CBAMs from free allocation of EUAs is likely to complement, reinforce and enhance the impacts of the wider package of proposals designed to deliver the higher emissions reductions goal recently agreed upon in the EU Climate Law. The introduction of CBAMs is thus more consistent with the effective operation of the wider policy package than continuing free allocation in its present form. These benefits include the following.

- CBAMs are more consistent with a tighter cap than continuing free allocation. This helps secure the effective functioning of the EUETS, with improved market price signals, so helping to ensure the stricter cap.

- CBAMs raise additional revenue, which can be used to support further emissions reductions.

- The structure of CBAMs appears likely to improve the economic attractiveness of CCfDs, thus enhancing the development and deployment of new low carbon technologies.

- CBAMS can incentivize the spread of carbon pricing internationally, including improving reporting and potentially supporting innovation, thus leveraging the effect of EU actions.

2.2.1 Consistency with the lower cap of the EU ETS

There are several ways to make the EU ETS cap fit for delivering the new EU 2030 target agreed upon in the EU Climate Law. In the context of this study, we assumed that for the ETS to deliver its fair share of the 2030 increased reductions target, a target of –65% for the ETS sectors in 2030 is recommended (using the MIX scenario of the EU 2030 Climate Target Plan Impact Assessment). Reaching this would require either a linear reduction factor (LRF) **of 4.8%** throughout the whole phase, or an LRF of 5% starting in 2023, or as was proposed in a recent leak on the EU ETS[11] , with a one-off reduction in 2026 equivalent of the difference between the current LRF and the one required throughout the phase for meeting the higher target.

Such a reduction as the leaked document describes would be the equivalent **of (257 MT)** under the current parameters and would imply a continued slope reducing at the 94 MT/ year rate **of (4.8%)** thereafter to 2030. The implications of most scenarios deliver similar implications for the future of free allocation of allowances in the current form.

In line with new 2030 target and the eventual goal of net zero, the EU ETS cap will have to be amended which will reduce the total number of allowances available.

Under the current free allocation regime, the number of freely allocated allowances would be an ever-growing proportion of the total cap, eventually exceeding it some time after 2030. Auction volumes would be correspondingly reduced, potentially creating difficulties for those sectors without free allocation, and losing revenue for governments (unless the price of EUAs increased greatly as a result of the lower auction volumes).

In contrast, CBAMs can reduce the number of free allowances that need to be allocated, because the introduction of a CBAM prices emissions in imports and thus avoids the need for free allocation. It, therefore, leads to free allocation being a reduced portion of the cap. This is illustrated in the chart below. **In 2021 free allocation is 36% of the total cap**. By 2030 it reaches over 60% of the total cap, when the cap is made fit for 2030, assuming no cross-sectoral correction factor (CSCF) is triggered due to built-in buffer provisions. The proportion of the cap going to free allowances is thus increasing, when it should be decreasing. If CBAMs were introduced to cover all the emissions from the sectors identified, in accordance to the document made public through the aforementioned leak from June 2021 (see page 10), the proportion of the cap accounted for by **free allocation would fall to only 34% in 2030**, reducing the problem but remaining the same as at the beginning of phase IV.

.

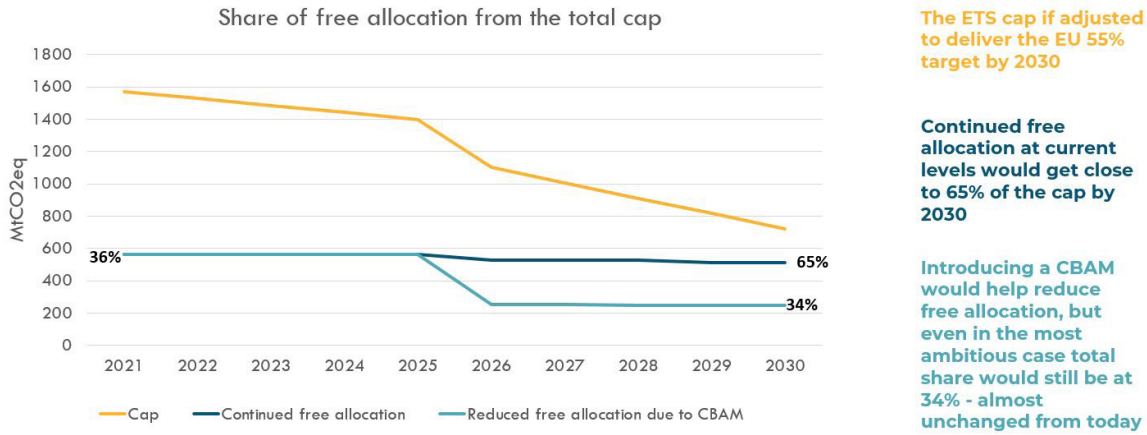


Figure 4: *Share of free allocation from the total cap, continuing with the current system and introducing a CBAM.*

Note: Currently the EU ETS cap continues to use 2005 as its baseline and aims to reach a -43% reduction in 2030, at an annual reduction rate of 2.2% (the linear reduction factor). However, due to the newly agreed increased target for 2030, modelling the old cap is no longer relevant. We have therefore modelled this against the cap proposed in the MIX Scenario from the 2030 Climate Target Plan Impact Assessment of the European Commission, from September 2020, a scenario that would deliver the new target.

The free allocation share can also end up being reduced drastically by the application of a cross-sectoral correction factor, but unlike the predictable and stable introduction of a CBAM which replaces free allocation, such a cut through CSCF would not be replaced by another policy instrument and industry would, from one year to the next, be fully exposed to the carbon price. This scenario is to be avoided, hence we chose not to model it. Nonetheless, **this very scenario is the high risk one for continued reliance on free allocation to industry and the very reason for the introduction of a CBAM.**

.

2.2.2 Additional revenue for reducing emissions

The introduction of CBAMs will raise additional revenue to finance other emissions reductions, because carbon is priced for all producers. EU producers will pay the carbon price under the ETS, while importers pay the equivalent price in the CBAM. Because all producers are paying the price it will be reflected in higher product prices. CBAMs avoid the need for free allocation to EU producers in those sectors covered, freeing up allowances that can then be auctioned instead.

Importers pay an equivalent carbon price set by a parallel class of allowances. Additional revenue is raised both from:

- the auction of allowances no longer needed to be given free to EU producers; and
- the sale of allowances to importers at a price equal to the EUA price.

The likely scale of the additional revenue raised is many billions of Euros of which this report focuses on, and will be discussed in greater detail in chapter 3.

This revenue can be used to reduce emissions elsewhere, and thus help secure climate goals. For example, these sources of revenue could be used to support carbon contracts for difference, other forms of support for innovation, or measures such as energy efficiency programmes. CBAMs thus help enable the transition to a low carbon economy more broadly than by the price signals they provide, although those are valuable in themselves.

This report proposes the creation of a European Carbon Contracts for Difference scheme, made up directly of the allowances freed up from free allocation, as an example of what a dedicated fund for scaling up breakthrough innovation in industrial decarbonisation could look like. In the eventuality that a CBAM would be introduced at 100% phase out of free allocation for the identified sectors in 2026, this would give an amount of 1308 MtCOO2eq in total or 262 million allowances yearly, without considering the application of a CSCF.

This direct conversion is proposed for the purpose of illustrating the possibilities embedded in these options. This is on the basis of the original goals of free allocation having been to create a level playing field between the European industries covered by the EU ETS and the rest of the world and to support their reinvestment in decarbonisation. Both of these objectives are supported by the CBAM alongside a European CCFD combination effectively serving the same legal objective, but in a more targeted complementary package of instruments for maximum effectiveness and to fastforward the reductions which will be needed if we are to meet the goals of the Paris Agreement or at least deliver the European share of that task, which would require the EU ETS to decrease emissions by at least -65% by 2030.

.

2.2.3 CBAMs and CCFDs

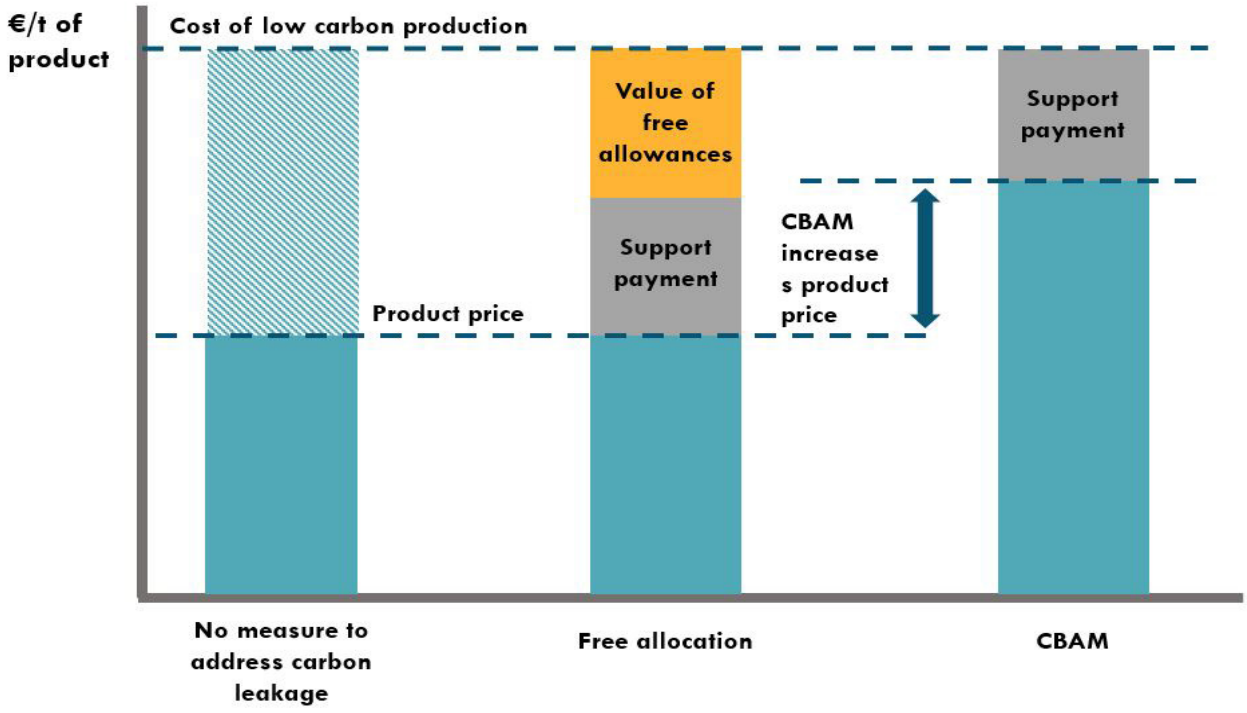
CBAMs could help reduce some of the risks for projects under CCFDs compare with free allocation, and so improve likely effectiveness.

Contracts for difference on the carbon price (CCfDs) are attracting increasing interest as a mechanism for supporting new low carbon technologies. A CCfD is a contractual payment to meet the additional costs of making production low carbon. Because contracts are legally binding and usually backed by governments they can provide certainty to investors, and thus can be a powerful mechanism for stimulating deployment.

> The European Carbon Contracts for Difference scheme proposed in this report could be complementary to existing financing mechanisms of the EU, such as the Innovation Fund. While some funding programmes, such as the Eu Innovation Fund, focus on the demonstration of innovative low-carbon technologies and the initial development of cutting edge projects, a CCfD scheme could build on such mechanisms to decrease operation costs and help deploy technologies and projects on a large scale. In other words, the CCfD scheme would build on the demonstration projects and first-of-a-kind commercial plants developed under the Innovation Fund and provide larger, operational support for the large scale deployment of technologies needed to reduce emissions in energy intensive industries.

Under a CCfD, payments are reduced as the carbon price rises, because the project is presumed to benefit from these higher prices. These reductions in payment are intended to avoid over-rewarding projects with excessive subsidy, and to reduce costs to governments. Similarly, they are intended to avoid projects receiving too little support if carbon prices fall.

However, projects realise the benefits of higher carbon prices in different ways under free allocation and CBAMs (see chart).



CCFDs have already been implemented in the Netherlands under the SDE++ system and its predecessors. A similar approach of using contracts for difference on the electricity price has been used successfully to support the deployment of renewable electricity in the UK.

A further possibility is to remove free allocation entirely from projects supported by contracts, and simply pay a subsidy unaffected by the carbon price. This may make the level of support clearer to investors. However, such support would no longer be in the form of a CCfD, potentially increasing costs to governments and making a transition to greater reliance on carbon pricing without additional support more difficult to achieve.

In contrast, **CBAMs** are intended to lead to the carbon price being reflected in product prices because all producers – importers and EU producers - will pay a carbon price. However low carbon production will not see any increases in costs, so will benefit from an increased margin.

The different ways in which low carbon projects benefit from higher carbon prices leads to different risks under the two mechanisms.
If **free allocation** is retained, a CCfD in effect largely fixes the price of freely allocated allowances, removing some carbon price risk from the project. However, allowance volume risks remain. The amount of free allocation may vary over time, for example as a result of changing benchmarks or application of the cross-sectoral correction factor. This would in turn significantly affect the value of support. There may also be some residual exposure to carbon price risk because free allocation does not match the volumes implicit in the CCfD.

These risks may lead to low carbon producers being less confident of the revenue from sale of allowances, and requiring additional subsidy as a result.

In the case of CCFDs income is clear under the contract. The main risk is that changes in the carbon price will not affect product prices in the ways expected. However, markets in most commodities covered by CBAMs are highly competitive, so a cost incurred by all producers should feed through into price. It may, however, take some time after the introduction of a CBAM for investors to be confident that this is the case in practice.

A move from free allocation to CBAMs may thus reduce risks to investors under a CCfD, especially after an initial period during which CBAMs have become fully established and operational. This may in turn lower the costs to governments of providing support via CCfDs. It would further enable industries to reach their full potential in passing through the costs of moving towards a low carbon industrial base, and help create markets for low carbon products by increasing their economic competitiveness of the current markets, currently deeply distorted by the allocation of free carbon allowances as well as other forms of subsidies.

.

Further EUETS reform

Other innovations could further improve the impact of the EUETS as a mechanism for stimulating low carbon investment. In particular, an auction reserve price for EUAs could be introduced to establish an effective floor on the carbon price. This would provide a more stable price signal and so reduce risks for investors in low carbon technologies.

This would be especially valuable for projects or technologies not covered by a CCfD, where the EUA price may be the principal or only carbon pricing incentive. Nevertheless, there are some advantages even in sectors where CCfDs are available. A floor on the carbon price could have advantages because it would reduce the risks to government of having to make large payments under the CCFD if carbon prices are low. This may in turn reduce the costs to governments, enabling them to finance a larger number and wider range of projects.

3 Taking the high road: 4 scenarios for the introduction of a CBAM

To understand the possibilities resulting from the introduction of a CBAM and freeing up of allowances, we looked at the four following scenarios, of which only one is substantiated in greater detail in the body of the report, while the others can be found in the Annexes to the report:

Glass half full	A quarter to midnight	Stairway to heaven	Fast Track
▪ Free allocation for CBAM sectors reduced by 50% starting in 2026 ▪ Reduction stays at 50% up to end of phase 4	▪ Free allocation for CBAM sectors reduced by 75% starting in 2026 ▪ Reduction stays at 75% up to end of phase 4	▪ Free allocation for CBAM sectors reduced by 50% starting in 2026 ▪ Reduction increases to reach 100% in 2030	▪ Free allocation for CBAM sectors is fully phased out in 2026

To model these scenarios, the Climact ETS model was used with Bellona assumptions plugged in, already incorporating the latest data on free allocation and activity level, as published in June 2021. The modelling aims to show two main results:

- How much revenue could be generated to support deep industrial decarbonisation by phasing out free allowances already in phase 4.
- The amount of free allowances that remain available for industry under different scenarios of fully phasing in a CBAM at different speeds.

Whenever monetary estimates of the allowances are used, a carbon price of 55 euros per tonne was used (the ETS allowance price on 25/06/2021). Since the ETS price has been increasing and will likely increase in phase 4, this is a conservative estimate. Also, in the two scenarios where free allocation reductions happen gradually year on year between 2026 and 2030, we are mindful that the volatility of the carbon price will impact the revenue raised by freeing up allowances from 2026 to 2030.

Until 2025, the only distinction made is between free allocation and auctioning. This is the case for all scenarios since the focus is only on free allocation, further distinction between auctioning and the funds is not needed. From 2026 to 2030, a distinction is made between free allowances for non-CBAM sectors, free allowances for CBAM sectors (in the scenarios where this applies) and allowances that CBAM sectors lost due to the phase out. All scenarios assume a one-of reduction in the cap in 2026 to 1,100 $MtCO_2eq$ (without it, the 2026 cap would be 1,357 $MtCO_2eq$) which results in the same endpoint in 2030 as if you would apply an LRF of 4.8% starting already from 2021. After the reduction, the LRF continues at 4.8%.

The following graph shows how much revenue could be available if some or all free allowances for CBAM sectors would be repurposed to support breakthrough innovation deployment at scale.

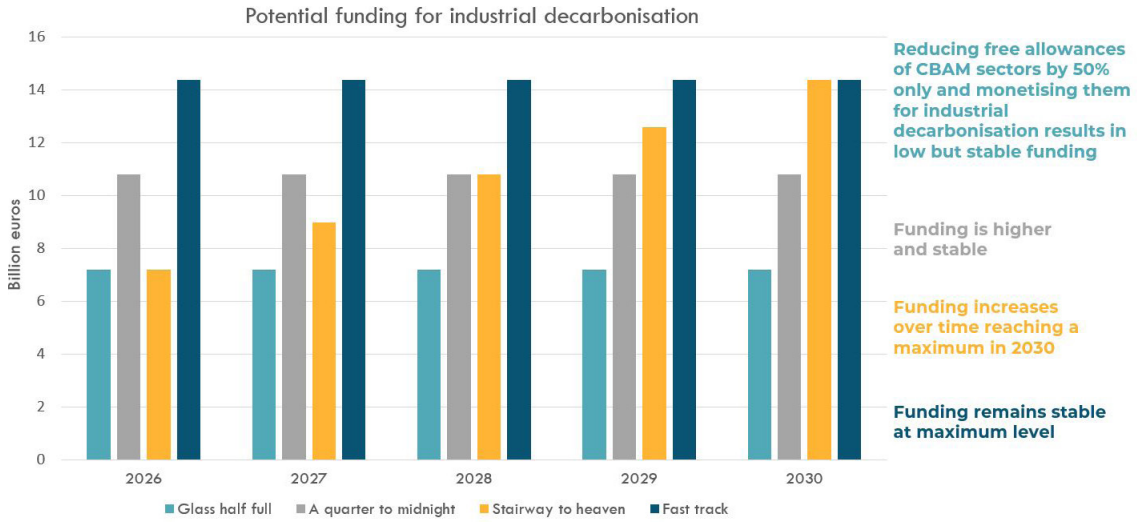


Figure 6: *Value of freed up allowances from CBAM sectors from 2026-2030 across the four scenarios.*

In all scenarios, the freeing up of allowances generates tens of billions of euros from 2026 to 2030. This is especially the case in the scenarios Fast track and A quarter to midnight. For scenarios A quarter to midnight and Stairway to heaven, it does not matter for the total amount which of the two is chosen. It does however affect when those resources would be available and given the foreseeable increase of the EUA price towards the end of phase 4, we could end up with a situation where Stairway to heaven generates more revenue than A quarter to midnight. However, despite that, in A quarter to midnight, more resources would be available sooner and would be more predictable. Given that we need investments in decarbonisation projects as soon as possible, A quarter to midnight and Fast track would be preferred over either of the other two scenarios.

In three of the four scenarios, industry still is allocated significant amounts of free allowances, particularly in Glass half full. Given that with the current system of free allocation, industrial emissions have not been reduced in the last decade, continuing to give free allocation is opposed to the EU's climate objectives. Auctioning those allowances instead and using the revenue for industrial decarbonisation would be far more successful in reducing industrial emissions and contribute to net-zero by 2050.

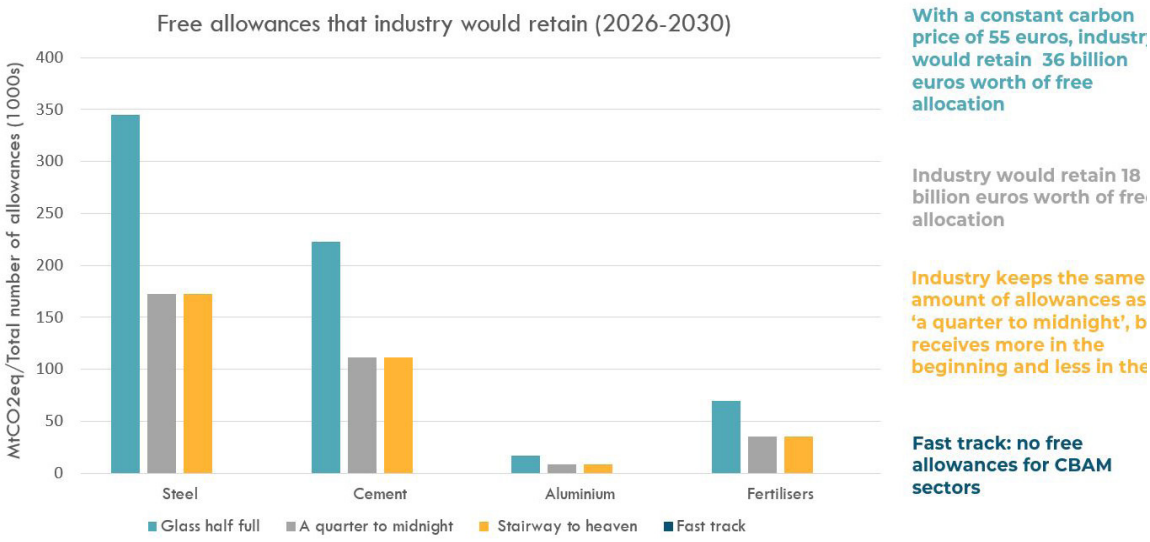


Figure 7: *Number of free allowances retained by the industry across the four scenarios.*

As an illustrative example, scenario A quarter to midnight is shown in greater detail below. The remaining scenarios can be found in Annex II.

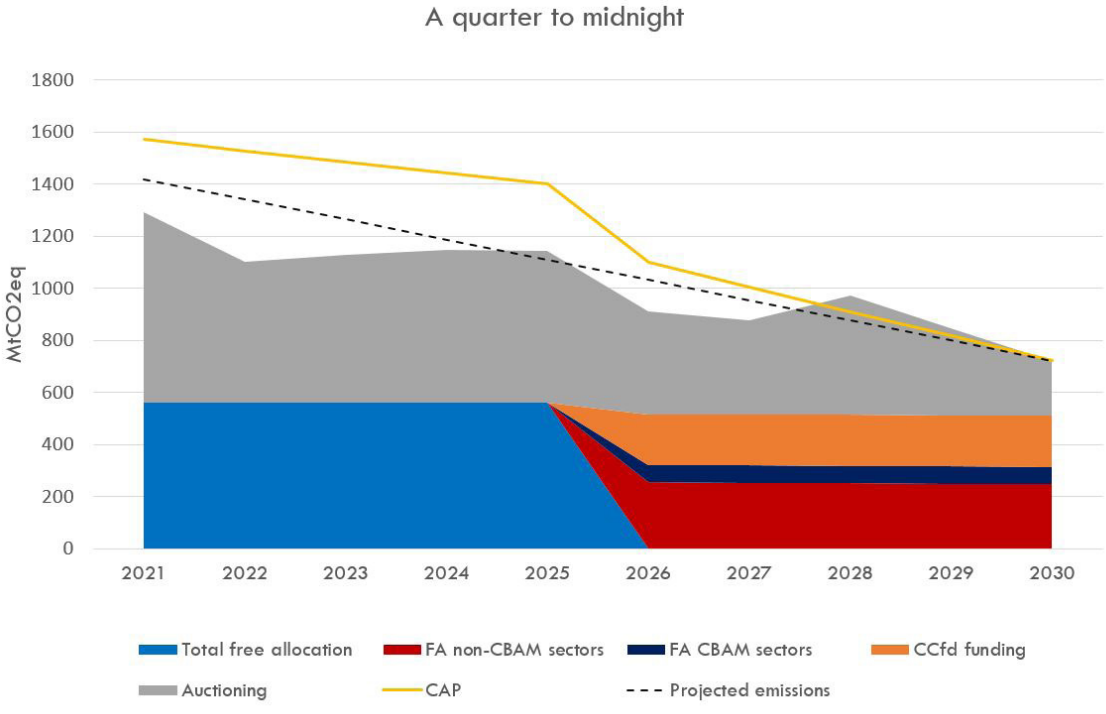


Figure 8: *Changes in free allocation distribution when phasing out 75% of free allowances following the introduction of a CBAM..*

In this scenario, free allocation accounts for 43% of the cap in 2030 compared to 36% in 2021 (same assumptions for the cap as in chapter 2 and earlier in chapter 3, cap is fit for 2030 at –65%). In this case, projected emissions remain under the cap until 2030. In total, CBAM sectors receive 1324 $MtCO_2eq$ of free allowances in allocation period 1 (AP1) and 327 $MtCO_2eq$ in AP2.

We also modelled how much free allocation each sector would continue to receive in all scenarios year on year. As far as this scenario is concerned, a graphic representation of this is provided below. For the other scenarios, this information is available in Annex II (where relevant since in the Fast track scenario, this amount would be zero, such a graph is not provided).

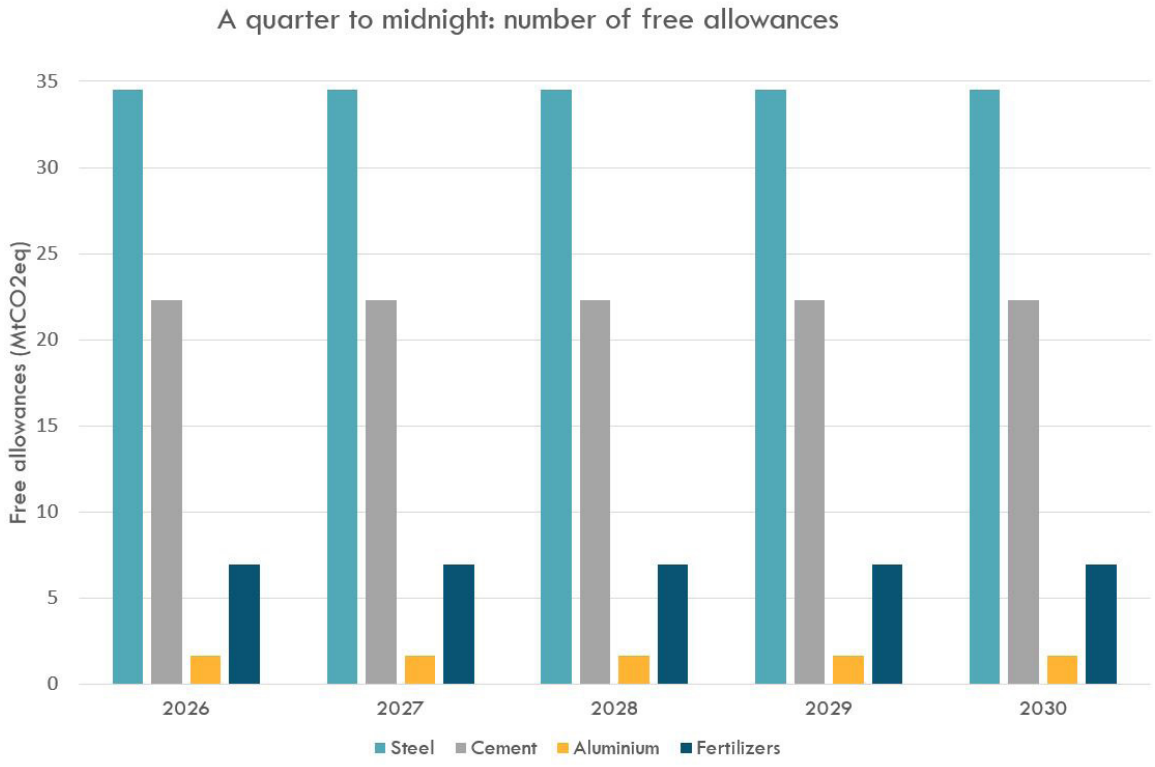


Figure 9: *Number of free allowances retained by the sectors covered by the CBAM when phasing out 75% of free allowances following the introduction of a CBAM.*

4 Encouraging international carbon pricing and standards setting

The introduction of CBAM will require additional data collection, including third party verification in many cases. This will in turn help improve international standards and practice for emissions reporting. This will subsequently help support emissions reductions as managing carbon flows requires first and foremost measuring them correctly in the first place.

As increasingly more countries outside the EU take up ambitious climate action, it will become increasingly important to harmonize standards to avoid confusing and unnecessary administrative burdens. The EU CBAM is a good tool to ensure that standards become shared, and that areas for improvement of data transparency are identified early on.

4.1 Accounting standards and data collection

It is essential that the Commission provides technical advice and support where needed in setting up reliable GHG emission accounting systems for imports as called for by the European Parliament. This would be particularly helpful for countries that might lack the experience and know-how for accurately measuring emissions.

While default values can be used initially, ideally this would move towards actual embedded emissions as soon as possible. Those that produce goods with lower embedded emissions than the default value will be incentivized to report this as fast as they can as they would have to buy less certificates. But those that produce goods with higher embedded emissions than the default value will be incentivized to keep using the default value as long as possible.

The additional data collection will also help gaining a better understanding in the flow of emissions between countries. Currently, emission accounting is based on the product-based approach where emissions are counted where they occur. This can give a misleading picture of a country's emission reductions when a country simply imports dirty goods instead of producing it itself. Mapping the flow of emissions will allow countries to better target their true carbon footprint. While also allowing for the comparison of similar goods exported from the same or different countries and CBAM encourages importers to choose goods with the lowest carbon footprint. This will incentivize competing third countries to lower the emissions of their goods leading to a race to the top.

.

Finally, there is a lack of transparency in CBAM as it seems that the number of purchased certificates will be kept secret. This in contrast with the ETS, where data on allowances is publicly available, though with a delay of a few years. This lack of transparency could make future analysis and evaluation of CBAM more difficult.

4.2 CBAMs generate revenues for innovation abroad

The introduction of CBAMs also works to promote international carbon pricing. in third countries. Importers into the EU must pay a carbon price in the form of separate allowances or they can choose to implement carbon pricing schemes in their own jurisdiction. The latter option leads to the creation of revenues from pricing pollution in third countries. The EU can use its own CBAM revenue to further match fund innovation in third countries.

However, importers into the EU will pay a reduced EU carbon price to the extent that a carbon price has already been paid in the jurisdiction of manufacture. Governments in those jurisdictions will have a clear incentive to retain this revenue for themselves by introducing or reinforcing their own carbon pricing systems. This will in turn likely provide wider incentives for decarbonization in those exporting jurisdictions, as any new carbon price there is unlikely to be restricted to only those emitters exporting to the EU.

Application of CBAMs within the EU will thus give incentives to introduce more widespread carbon pricing elsewhere. This is a potentially significant additional benefit from the introduction of CBAMs. Revenue raised from additional carbon pricing may be used to finance further innovation and emissions reduction in the exporting jurisdiction. A CBAM in the EU may thus, via encouraging carbon pricing elsewhere, enable additional spending on emissions reductions in exporting countries.

This can complement the direct funding the EU may give to assist with clean development.

Fifteen selected developing and emerging economies were analysed in a recent OECD report Taxing Energy Use for Sustainable Development account for less than 4% of global emissions, whereas OECD and G20 countries collectively account for more than three-quarters of global carbon emissions. It concluded that carbon pricing in developing countries has multiple potential benefits:

- Tackling local pollution
- Mobilising domestic revenue (1% of GDP with a carbon price of 30 eur/ton)
- Putting pressure on large polluters to step up their game.
- Increasing their ability to participate successfully in a decarbonising global economy.
- Encouraging cleaner investment and consumption choices for all public and private spending
- Avoiding many of the transition costs that the developed world is facing today
- Tackling the high levels of informality in developing countries,
- Contributing to SDGs 12, 13, 3, 7, 10 and 11

Most importantly, the introduction of a CBAM avoids the development of “carbon havens” with concentrations of high carbon production outside the EU. This requires that no countries are excluded as polluting companies for which the EU is an important market, could decide to move to those countries. This can have detrimental impacts on local air quality and any potential climate benefit from CBAM would be negated. If our scenario modelling would need to give a title to, would probably be labelled as the Highway to Hell.

Barriers to carbon pricing lie in making sure that change is equitable and aligned with the country’s development objective. These can be addressed by careful design. The benefits of carbon pricing for exporting countries set out in the OECD report can be retained without hampering other objectives.

.

5 Conclusion

The delivery of a 2030 target that is in line with the EU's long-term goal of reaching net-zero greenhouse emissions by 2050, will be dependent on whether or not the EU ETS will be amended for this purpose. There are two components to making the EU ETS fit for its purposes: amending the cap to deliver at least –65% emission reductions by 2030 and replacing the system of free allocation with a more targeted support system to stimulate industrial transformation to take place already before 2030.

As the world moves steadibly and rapidly towards the same goal of carbon neutrality by the second half of the century and more than half of the world's GDP is covered by net-zero pledges, the old rationale for carbon leakage protection has fundamentally changed. The introduction of a CBAM becomes a better suited policy innovation for this point in time as it has the benefit of minimising divergence between the pathways takes by different countries towards the same goal. A CBAM is also a necessary step for the EU in the direction of setting global emissions accounting standards and taking responsibility for its own import and consumption carbon footprint.

If the unsustainable system of free allowances continues unamended as thus far, it is unlikely the EU ETS will provide the rights set of incentives and financial support to stimulate industrial transformation at the scale required before 2030. Additionally, the fact that the proportion of free allowances will soon run into the EU ETS cap raises major uncertainties for investments in long-term projects for industry decarbonisation, requiring new instruments to be introduced to replace the old system. Instead, the combination of a CBAM with a new fund made up of the freed up allowances and focused on deploying innovation at scale, by reducing operational costs of projects, etc. Should be promoted. Such a fund would be complementary to the Innovation Fund because it would seek to maximise the effects and success stories developed there, by commercialising them at scale.

This report models four scenarios for how a CBAM could be made part of the Fit for 2030 package to be launched in July 2021 as part of the EU Green Deal agenda and concludes that at least 75% coverage for the selected sectors should be pursued. This option has the benefit of generating more income for innovation and deployment earlier on in Phase IV (already in 2026) therefore having the possibility of turning the next decade into one of action and success for the transformation of heavy industry in the EU.

.

Annexes

Annex I: Benchmarks and free allocation under the California cap and trade system

In California, free allocation for industry is calculated in a different way than in the EU ETS. Unlike the EU ETS, where the production data of 2014 to 2018 or 2019 to 2023 is used, in California, they use the actual production data of the year for which allowances are given[12][13]. But the biggest difference with the EU ETS is C which is the cap adjustment factor. During the period 2021-2030, the cap will decline by approximately 13.4 $MtCO_2e$ each year, or about 4% annually on average, reaching 200.5 $MtCO_2e$ in 2030.[14] Thus, free allocation declines annually, unlike the EU ETS where free allocation remains constant between 2021-2025 and 2026-2030. Free allocation for industry in California is calculated via the following formula:

FA = A x B x C x O

Where FA = free allocation to industrial facilities, A = Assistance factor, B = benchmark, C = Cap adjustment factor, O = Output. A represents the risk to carbon leakage and corresponds to the CLEF used in the EU ETS. B is the benchmark and equals representative GHG emissions per product. O is the annual facility output. Data on A, B and C was taken from the regulation.[15]

There are two different cap adjustment factor trajectories in California. One for activities with more than 50% of total emissions from process emissions, a high emissions intensity and a high leakage risk (e.g. cement) and one for standard activities (e.g. steel production using an electric arc furnace). Extrapolating known values for C (2013-2031), the cap adjustment factor reaches zero in 2084-2085 for sectors like cement and 2048-2049 for sectors like EAF steel production. This is much sooner than EU ETS benchmarks (centuries sooner).

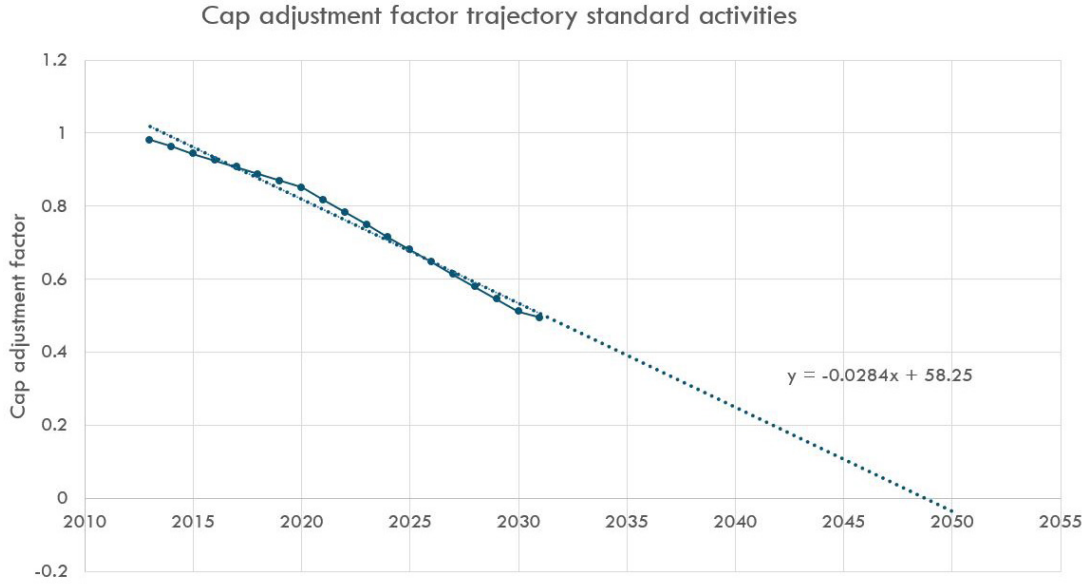


Figure 10: *Cap adjustment factor trajectory for standard activities under the Californian Cap&Trade program.*

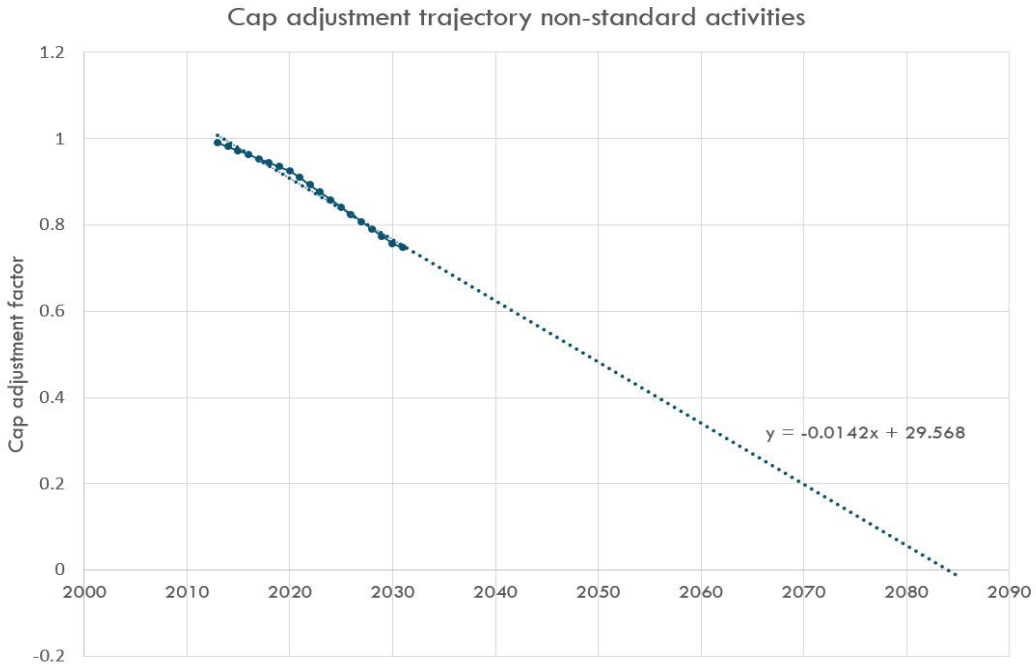


Figure 11: *Cap adjustment factor trajectory for non-standard activities under the Californian Cap&Trade program.*

FA alternative represents the amount of free allocation the cement sector would have gotten if it used the EU ETS formula:

FA = CLEF x B x HAL. CLEF is the same as A.

Cement: for HAL the output of 2017 of 9 Mt was used.[16] Clinker production in California was fairly stable between 2014-2018, thus HAL will be approximately the same as O. Since in the EU, the benchmark is updated in 2026, the Californian benchmark was reduced with the same factor as the EU benchmark for grey cement clinker will reduced in 2026 relative to 2025 in the Climact model. In California, there is only one benchmark for cement. Grey cement clinker was chosen as it represents nearly all clinker production in the EU (98.3% based on data from Climact model).

The total monetary difference in free allocation would be 220 million USD dollars or 185 million euros. USD was converted to EUR using the exchange rate from 24 Jun, 14:50 UTC provided by Morningstar (via Google) with 1 USD = 0.84 EUR. A carbon price of 22 USD was used.[17]

Steel: there is only one steel producer in California. Due to a lack of data availability, the maximum capacity of its rolling mill was used for HAL and O[1819]. Since in the EU, the benchmark is updated in 2026, the Californian benchmark was reduced with the same factor as the EU benchmark for EAF carbon steel is reduced in 2026 relative to 2025 in the Climact model. EAF carbon steel was chosen over EAF high alloy steel as that is the one the California Air Resources Board lists as the counterpart to the Californian benchmark.[2021]

The total monetary difference in free allocation would be 5.3 million USD dollars or 4.4 million euros less for US industries than they would receive if they were inside the EU ETS, proving once again the lack of ambition of the EU ETS.[22]

Annex II: Further details of scenario analysis

Glass half full

In this scenario, free allocation accounts for 53% of the cap compared to 36% in 2021. In total, CBAM sectors receive 1324 $MtCO_2eq$ of free allowances in allocation period 1 (AP1) and 654 $MtCO_2eq$ in AP2.

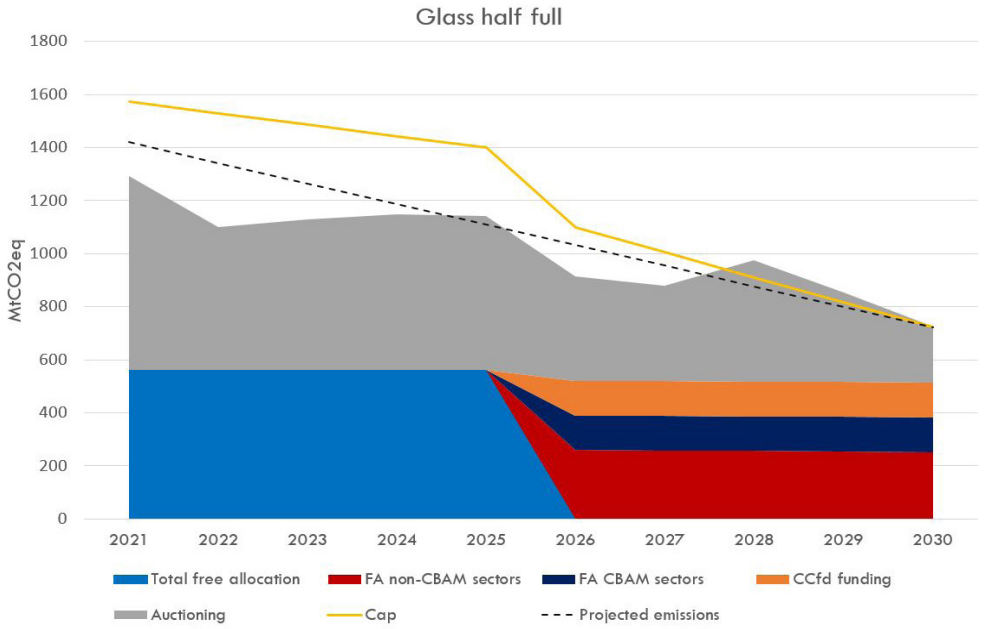


Figure 12: *changes in free allocation distribution when phasing out 50% of free allowances following the introduction of a CBAM.*

In the following graphs show the value of the free allowances that the CBAM sectors would keep under the Glass Half Full scenario.

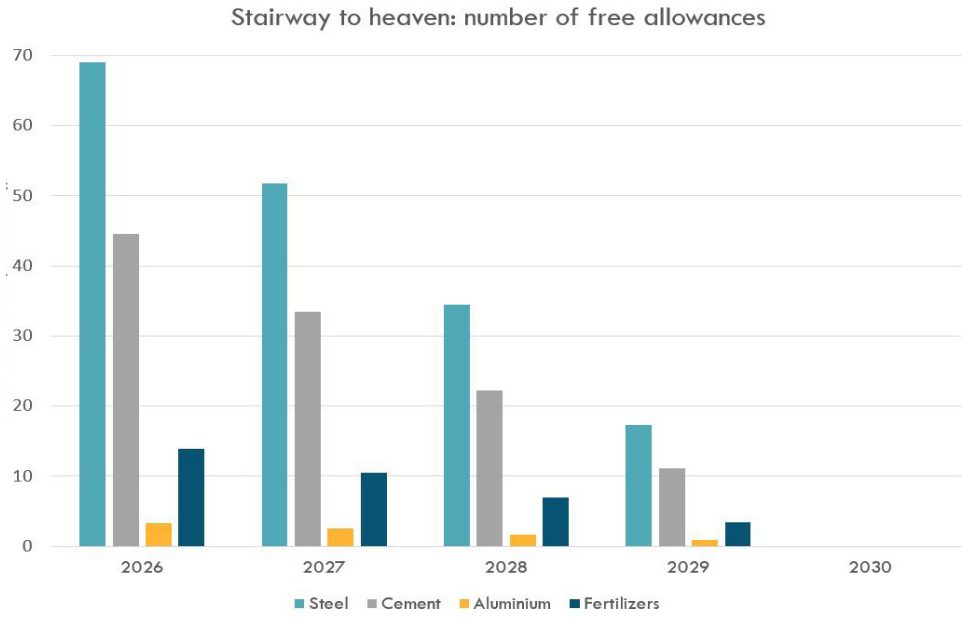


Figure 13: *changes in free allocation distribution when gradually phasing out 100% of free allowances following the introduction of a CBAM.*

Stairway to heaven

In this scenario, free allocation is completely phased out by 2030. Free allocation accounts for 34% of the cap compared to 36% in 2021. In total, CBAM sectors receive 1324 $MtCO_2eq$ of free allowances in allocation period 1 (AP1) and 327 $MtCO_2eq$ in AP2.

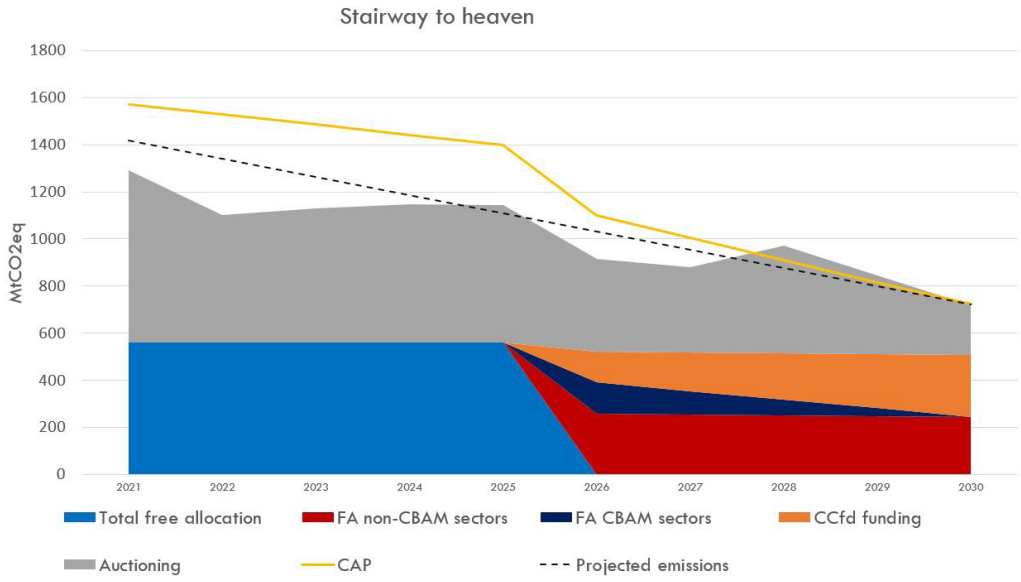


Figure 14: *changes in free allocation distribution when gradually phasing out 100% of free allowances following the introduction of a CBAM.*

The following graph shows the value of the free allowances that the CBAM sectors would keep under the Stairway to Heaven scenario.

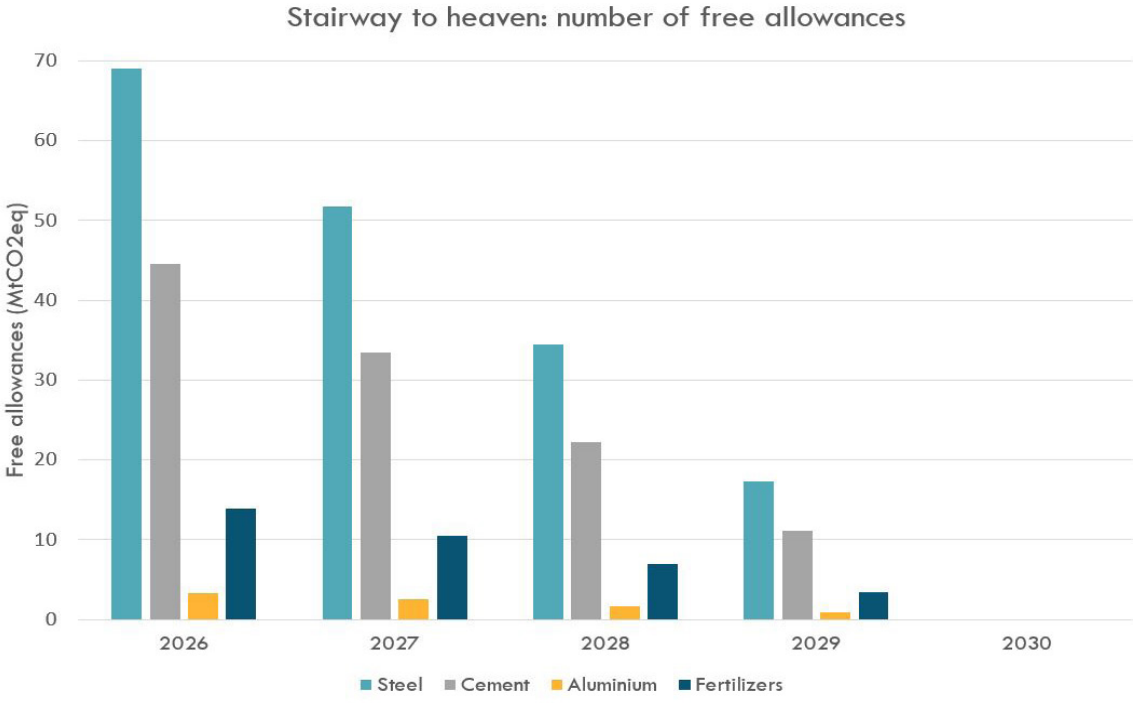


Figure 15: *Number of free allowances retained by the sectors covered by the CBAM when gradually phasing out 100% of free allowances following the introduction of a CBAM.*

REFERENCES

1 https://www.euractiv.com/section/energy-environment/news/von-der-leyen-pressed-to-deliver-on-climate-after-winning-eu-vote/

2 https://www.europarl.europa.eu/doceo/document/TA-9-2021-0071_EN.html/

3 https://www.euractiv.com/wp-content/uploads/sites/2/2021/06/CBAM-Regulation-Draft.pdf

4 https://carbonpricingdashboard.worldbank.org/

5 https://carbonmarketwatch.org/2021/06/07/europes-industry-polluters-make-e50-billion-in-carbon-market-windfall-profits/

6 https://institutdelors.eu/wp-content/uploads/2021/04/JDI-E3G-paper_innovation-in-the-ETS_final.pdf

7 EU Emissions Trading System (ETS) data viewer — European Environment Agency (europa.eu)

8 The Green Brief: CBAM enters with a bang – EURACTIV.com

9 LEAK: EU's carbon border tariff to target steel, cement, power – EURACTIV.com

10 WTO | legal texts - Marrakesh Agreement

11 https://www.euractiv.com/section/energy-environment/news/eus-carbon-border-tariff-to-target-steel-cement-power/

12 https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program/allowance-allocation/allowance-allocation-industrial

13 https://ec.europa.eu/clima/sites/default/files/ets/allowances/docs/p4_gd2_allocation_methodologies_en.pdf

14 https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems%5B%5D=45%E2%80%AF%E2%80%AF

15 https://ww2.arb.ca.gov/sites/default/files/2021-02/ct_reg_unofficial.pdf

16 https://www.climateworks.org/wp-content/uploads/2019/09/Decarbonization-Roadmap-CA-Cement-Final.pdf

17 https://www.theice.com/marketdata/reports/datawarehouse/ConsolidatedEndOfDayReportPDF.shtml%E2%80%AF%E2%80%AF%E2%80%AF

18 https://www.steel.org/wp-content/uploads/2020/07/AMM-Steel-Producers-Map-2018.pdf

19 https://www.argusmedia.com/en/news/1995837-cmc-shuts-california-rebar-melt-shop-cites-regulations

20 https://ww2.arb.ca.gov/sites/default/files/classic/regact/2010/capandtrade10/candtappb.pdf

21 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011D0278&from=EN

22 https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program/allowance-allocation/allowance-allocation-industrial