

ASSESSMENT OF REFORM OPTIONS FOR THE EU ETS

Study on behalf of EnBW AG

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EXECUTIVE SUMMARY

In its Green Deal, the EU commission proposed an ambitious target to decrease greenhouse gas emissions in the EU by at least 55% until 2030, compared with 1990 levels, the EU parliament aimed for a target of 60%. In its provisional agreement on the European Climate Law reached in April 2021, the EU institutions settled for a 55% reduction target acknowledging the need to enhance the EU's carbon sink through a more ambitious LULUCF regulation. This represents a clear step up from initial goals to reduce CO₂ emissions by just 40%. The EU ETS plays an important role in the EU's policies combatting climate change and regulates CO₂ emissions of the most emission intensive sectors in the EU, accounting for almost 50% of the EU's greenhouse gas emissions. The EC is expected to propose specific reforms of the EU ETS over the summer of 2021. In this study, we discuss and evaluate different options to reform the EU ETS in the timeframe until 2030¹. Our analysis focusses on the key parameters of the EU ETS and assumes a combination of measures that would align the EU ETS with increased ambitions of the EU Green Deal.

The main conclusions of our study can be summarised as follows:

- EU ETS needs to be reformed – as otherwise, targeted CO₂-reductions are achieved outside of the EU ETS. Absent reform, a significant surplus of allowance would build up and the ETS runs into the danger of becoming irrelevant.
- If the overall GHG reduction EU targets are understood as net-reduction targets, i.e. taking into account the contribution of carbon sinks (LULUCF), a reduction of -55% compared to 1990 can be translated into a reduction target for the ETS of -59% compared to 2005. In doing so, we assume that the contribution of ETS and Non-ETS sectors to emission reduction are held constant vis-à-vis current legislation.
- In the short term (until 2030), there are several options to reform the EU ETS. In our analysis, we focus on the key parameters that determine supply of allowance and discuss an adjustment of the Linear Reduction Factor (LRF), a rebasing of the cap and modifications of the Market Stability Reserve. All of the above-mentioned measures are interlinked and should be evaluated accordingly.

¹ The study was completed before an agreement between EU Commission and Parliament was achieved. Therefore, we analysed possible reform scenarios based on both, a 55% and 60% reduction target.

- A mix of adjustments seems to have merits: The EC target to lower EU emissions by 55% could be supported by increasing the linear-Reduction-Factor (LRF) from today's 2.2% to 3.8%, accompanied by a one-off rebasing of the cap of 200 mn. tCO₂.
- Without reform, the structural oversupply with certificates may amount to 2 to 2.4 bn. tCO₂ in 2030 even though 3 bn. tCO₂ are cancelled by the MSR. The MSR will remain an important instrument in the ETS and maintaining a more flexible framework with a higher intake rate will enable the system to absorb this oversupply. Higher intake rates are especially effective if the thresholds for the MSR to take action are also adjusted (downwards).
- A reduction of ETS cap in line with a 55% target will decrease auction volumes in 2030 by 40% or more compared to today, nonetheless, revenues for member states over the course of trading phase IV will remain more or less stable due to increasing CO₂ prices.
- Until 2030, prices for CO₂ certificates will most likely not provide significant incentives for a deep decarbonisation of the industry – other measures such as e.g. Carbon Contracts for Difference could offer additional support.
- In the longer term, the current framework to protect industry from carbon leakage will lose its grip. New instruments to support decarbonisation of industry while protecting domestic production from competitive distortions are needed: A Carbon Border Adjustment Mechanism could be an effective yet complex instrument to protect the energy intensive industry in the EU.
- Expanding the EU ETS to other sectors such as maritime navigation can increase the overall efficiency of decarbonisation in the EU and increase the liquidity of the EU ETS in the medium and longer term. There are different ways to integrate new sectors into the system, from gradual coupling of sectors via linking CO₂ prices in one sector to the EU ETS, up to full integration of supply and demand of certificates into the trading system. However, the expansion should be assessed carefully, since an inappropriate implementation could lead to distortions in the sensitive EU ETS market.

1. THE EU ETS NEEDS TO BE REFORMED



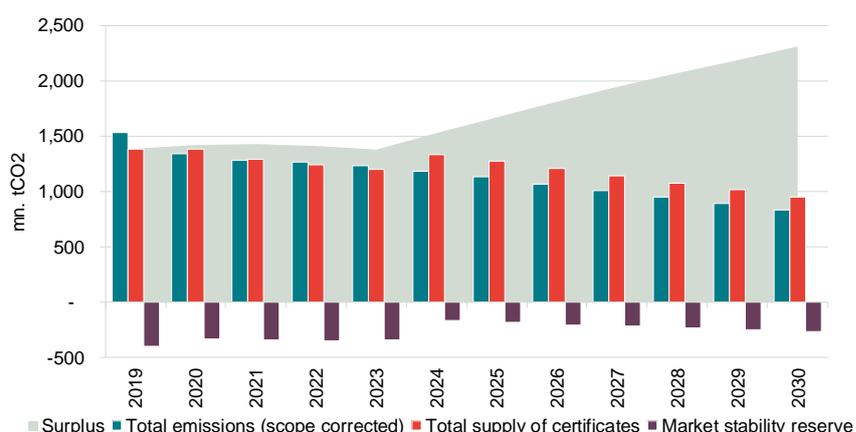
Without reform, the EU ETS will not deliver the required incentives to decarbonise the economy

The EU ETS has entered into its fourth trading phase. The legal framework for emission trading on European level is defined until 2030. However, the current configuration of the EU ETS with a Linear Reduction Factor of 2.2% will not deliver the CO₂ abatement required to meet the higher reduction targets formulated in the Green Deal.

Modelling of the ETS indicates that the current setting will lead to a significant surplus of CO₂-certificates if the CO₂ abatement is driven by measures that work along-side the ETS, for example RES-E expansion and coal phase-outs. If emissions from the power sector and energy-intensive industry are assumed to decrease by ca. 60% compared to 2005, in line with the EU Green Deal ambitions, we expect the following development in the ETS:

- The mechanisms of the ETS in their current design – namely the Market Stability Reserve – would not be able to prevent a structural surplus of CO₂ certificates of > 2 billion tCO₂ building up.
- Therefore, the configuration of the EU ETS needs to be adjusted in order to bring the ETS in line with overall ambitions and towards a 2030 target of at least -55% reductions on 1990 levels.

Figure 1. Development of the EU ETS under business-as-usual configuration



Source: Frontier Economics

2. TRANSLATION OF THE GREEN DEAL INTO THE EU ETS



Transformation of Green Deal target to the EU ETS as starting point for any reform

The sectors of the EU economy can be split into those sectors that are subject to the ETS and those that fall under the Effort Sharing Directive (ESD). The target of the Green Deal to reduce emissions in the EU by at least 55% applies to the whole EU economy. Hence, in order to define appropriate scenarios for the EU ETS, the 55% (or 60%) %-target has to be broken down to ETS and ESD sector targets.

This transformation of an increased overall GHG reduction target for 2030 (e.g. -55%) into a specific ETS reduction target relies on two key aspects which are currently still under debate:

- **Definition of the reduction target as net or gross target** – Whether or not the contribution of carbon sinks from Land Use, Land-Use Change and Forestry (LULUCF) is considered in the 55% determines the amount of emission abatement required by other sectors. In its impact assessment, the Commission presented a net-target, i.e. taking into account the contribution of carbon sinks. The provisional agreement on the EU Climate Law also adopted this view.²
- **Split of emission reduction between ETS and ESD sectors** – Which share of the -55% is provided by ETS or ESD sectors presents one of the key questions. In the past, due to more efficient abatement options, ETS sectors faced stricter reduction targets than ESD sectors. A decision on the sector contributions has not yet been taken.

For our modelling of the ETS, we derive the ETS target based on the following assumptions:

- In line with the European Commission and the provisional agreement on the EU Climate Law³, **we interpret the CO₂ reduction target of the Green Deal as a net reduction target,**

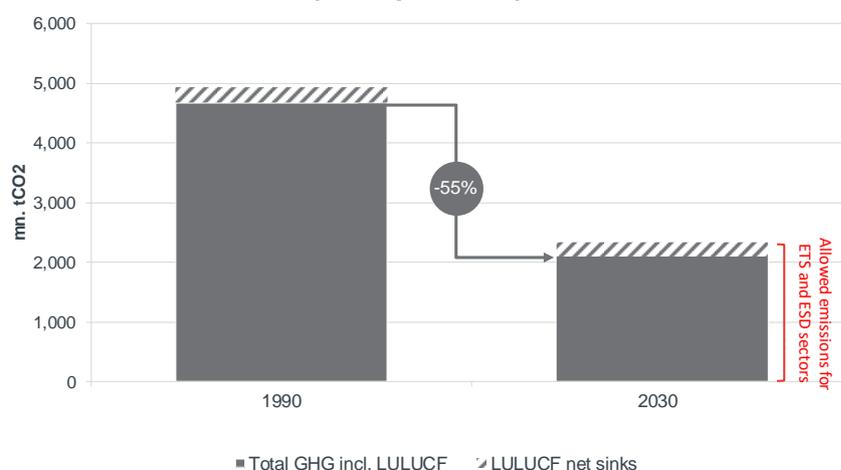
² Council of the European Union (5 May 2021): Proposal for a Regulation of the European Parliament and of the Council establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999 (European Climate Law) (8440/21).

³ See for example European Commission (2020): Commission staff working document - Impact assessment accompanying the document Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Stepping up Europe's 2030 climate ambition - Investing in a climate-neutral future for the benefit of our people, Part 1/2, p. 14.

taking net sinks from LULUCF in both 1990 and 2030 into account.

- A reduction of 55% results in a net target value for total GHG emissions in 2030 of 2.1 billion tCO₂ (**Figure 2**). The net-emissions of EU27 in 1990 amount to 4.67 G tCO₂ (after correction for net sinks from LULUCF of 0.26 GtCO₂). The “allowed emissions” for the ETS and ESD sectors (i.e. the gross emissions) in 2030 add up to 2.33 GtCO₂ assuming net sinks from LULUCF in 2030 of 0.225 GtCO₂⁴.

Figure 2. The overall EU GHG reduction target based on net reduction (example -55%)



Source: Frontier Economics based on EEA and EC

Note: GHG emissions of EU27

-59% vs. 2005

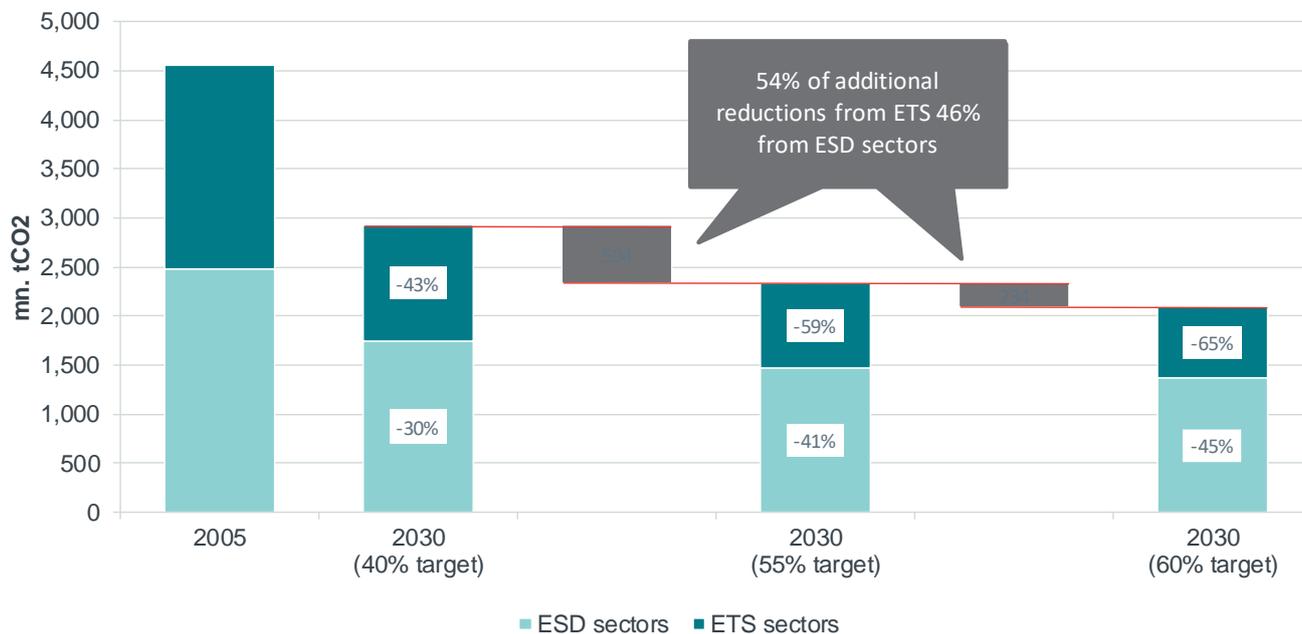
Reduction of the ETS cap compliant with a Green Deal target of 55% (vs. 1990) if ETS and ESD sector contributions remain unchanged

- **We assume constant contribution of ETS and ESD sectors to the overall target** – Under current legislation, the ETS has to reduce its 2030 emissions by 43% compared to 2005 to reach the overall 40% target. The reduction target for ESD sectors amounts to 30%. Overall, this translates into contributions of 54% of the ETS and 46% of the ESD to the overall GHG reductions needed. Keeping the contribution shares of ETS and ESD sectors constant results in an emission target for the ETS of 0.86 GtCO₂ in 2030, corresponding to a **59% reduction compared to 2005 (Figure 3)**. For the ESD sectors the 55% reduction target translates into an emission target of 1.47 GtCO₂ in 2030: a reduction by 41% compared to 2005.

⁴ European Commission (2020): Commission staff working document - Impact assessment accompanying the document Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Stepping up Europe's 2030 climate ambition - Investing in a climate-neutral future for the benefit of our people, Part 2/2, p. 48.; Council of the European Union (5 May 2021): Proposal for a Regulation of the European Parliament and of the Council establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999 (European Climate Law) (8440/21), Art. 3.

Using this methodology, a **60% overall reduction** target would correspond to an **ETS cap of -65%** compared to 2005.

Figure 3. ETS and ESD reduction targets assuming constant contribution shares



Source: Frontier Economics

Note: Labels show the emission reductions compared to 2005

3. SEVERAL OPTIONS TO REFORM THE ETS IN THE SHORT TERM – ALL OF THEM ARE INTERLINKED

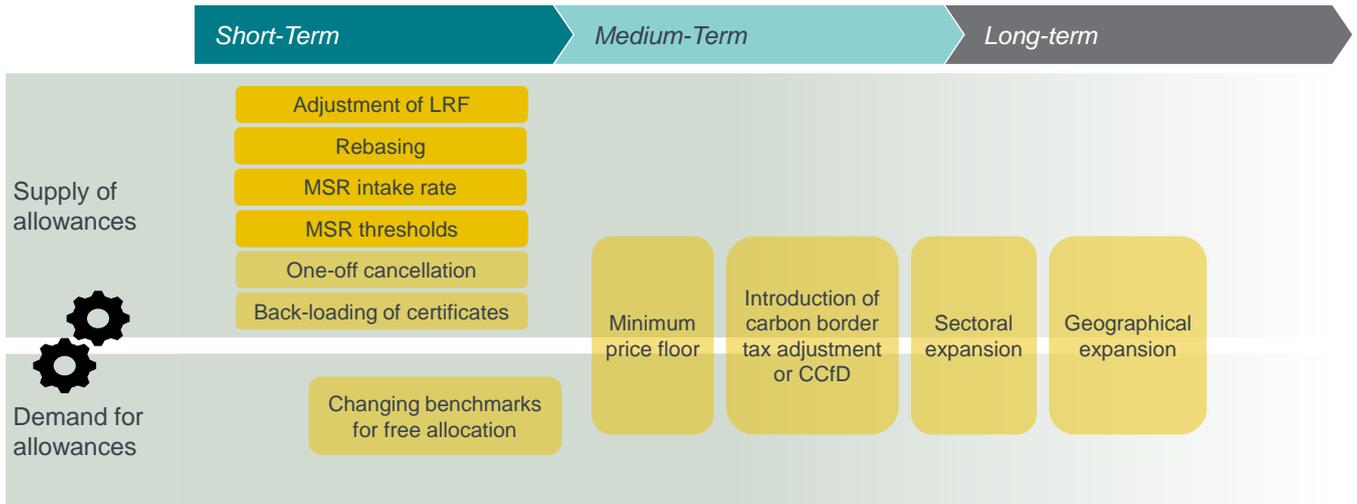
The central instruments to steer emission abatement in the EU ETS are represented by

- the **Linear Reduction Factor** defining the annually decreasing volume of new supply; and
- the **Market Stability Reserve** which adapts the supply volumes (auctions) to changing market conditions and external shocks.

In its Impact Assessment, the European Commission additionally discusses a new measure, the so-called **rebasing** of the cap. Verified emissions have decreased in the past faster than anticipated. In addition, the economic consequences of the COVID pandemic have led to a short-term drop in industrial output and electricity consumption. Therefore, a structural surplus has developed. This structural mismatch between demand and supply could be alleviated by a downward shift of the overall cap.

These measures represent the key levers to adjust the CO₂-certificate supply in the EU ETS to match the EU Green Deal. In the medium to longer term, further structural reforms of the EU ETS, like integrating new sectors or geographies are also being discussed. The choice of options should be based on an integrated assessment. Due to interactions between the different mechanisms, the levers cannot be evaluated in isolation.

Figure 4. Reform options for the EU ETS



Source: Frontier Economics

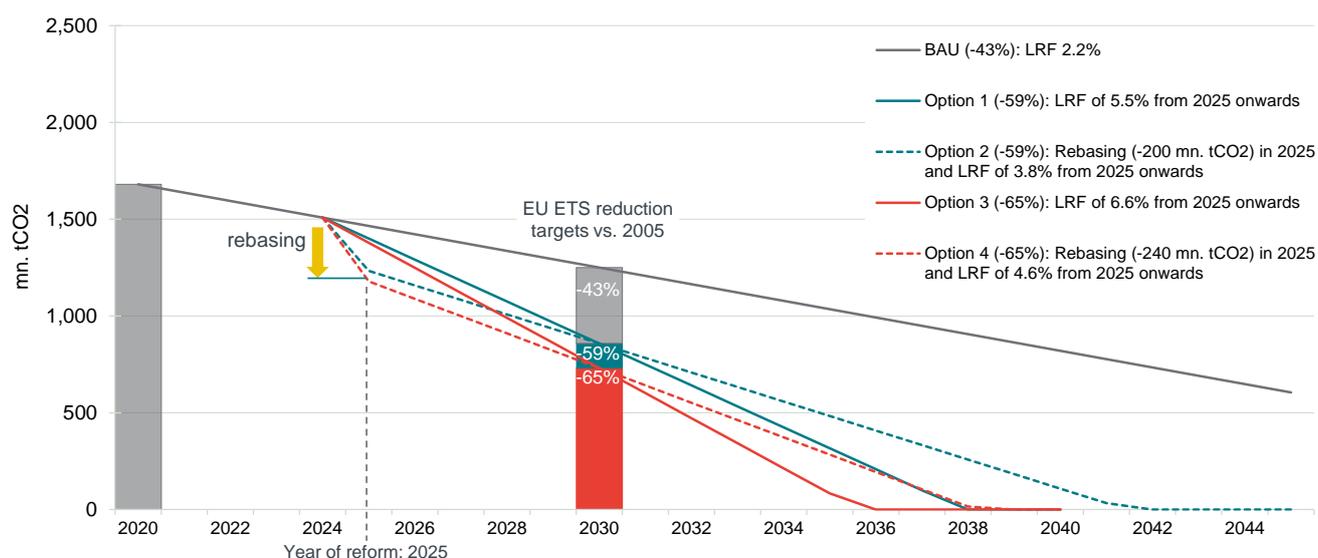
4. ADJUSTMENT OF THE ETS CAP IN LINE WITH THE EU GREEN DEAL

In the following, we examine how the -59% (or -65%) could be achieved by adjusting the cap of the EU ETS. Due to the lead time to pass and adopt reforms, we assume that such an adjustment takes place in 2025. We analyse two options of achieving the 2030-target, With and without a rebasing of the cap in 2025 (**Figure 5**):

- Based on the **55% EU target (EU climate law)**, the LRF should amount to 3.8% if the cap is rebased by 200 million tCO₂. Absent rebasing, the LRF would need to amount to 5.5%.
- Based on the previously discussed alternative of a **60% EU target**, the LRF should amount to 4.6% if the cap undergoes is rebased by 240 million tCO₂. Absent rebasing, the LRF would need to amount to 6.6%.

Additionally, a very steep LRF without rebasing would in both cases (55% and 60% target) would reduce the supply of new allowances to zero well before 2040 (**Figure 5**).

Figure 5. Ways to achieving the 2030-target



Source: Frontier Economics

5. A COMBINATION OF REBASING AND HIGHER LRF HAS ITS MERITS



Evaluating reforms of the ETS requires in integrated assessment of the different options

In the following, we analyse how different combinations of ETS supply parameters affect the overall supply of allowances in the ETS over the course of the fourth trading period. More specifically, we calculate how many new certificates will be auctioned or allocated and how many will remain in the stock of the MSR in 2030.

We consider the following reform scenarios (**Figure 13**):

- ETS Cap corresponding to 55% (EU Climate Law) or 60% (alternative scenario) net-reduction target on EU level;
- Cap reduction achieved through an increase of the LRF with or without rebasing;
- Configuration of the MSR with status-quo intake rate (12% after 2023), an increase after 2023 to 18% or 24% of surplus and an increase to 24%, coupled with an adjustment of the MSR thresholds that trigger intervention from the MSR.⁵

We combine the possible ETS cap definitions with the different configurations of the MSR.

Table 1. ETS reform scenarios

ETS Cap	EU Climate Law		Alternative scenario	
EU target vs. 1990	-55%		-60%	
ETS cap vs. 2005	-59%		-65%	
LRF	5.5%	3.8%	6%	4.6%
Rebasing (mn. tCO ₂)	-	200	-	240
MSR scenario:				
MSR intake rate after 2023	12%	18%	24%	24%
MSR thresholds	[833;400]	[833;400]	[833;400]	[400;200]

Source: Frontier Economics

⁵ In its current configuration, the MSR reduces the number of allowances auctioned if the TNAC (total number of allowances in circulation) exceeds 833 mn. tCO₂. If TNAC falls below 400 mn. tCO₂, auction volumes increase by 100 mn. tCO₂.

Rebasing of the cap reduces effective supply and alleviates pressure from the MSR

We evaluate the effectiveness of reform scenarios based on the total supply of new allowances over the period 2021-2030 and the number of allowances in the stock of the MSR (*effective supply*) compared to the Business-as-usual scenario (BAU) without reforms of the ETS supply.

If the reduction of the cap is achieved through a combination of an increase of the LRF and rebasing, effective supply volumes over the fourth trading period decrease more rapidly than without rebasing:

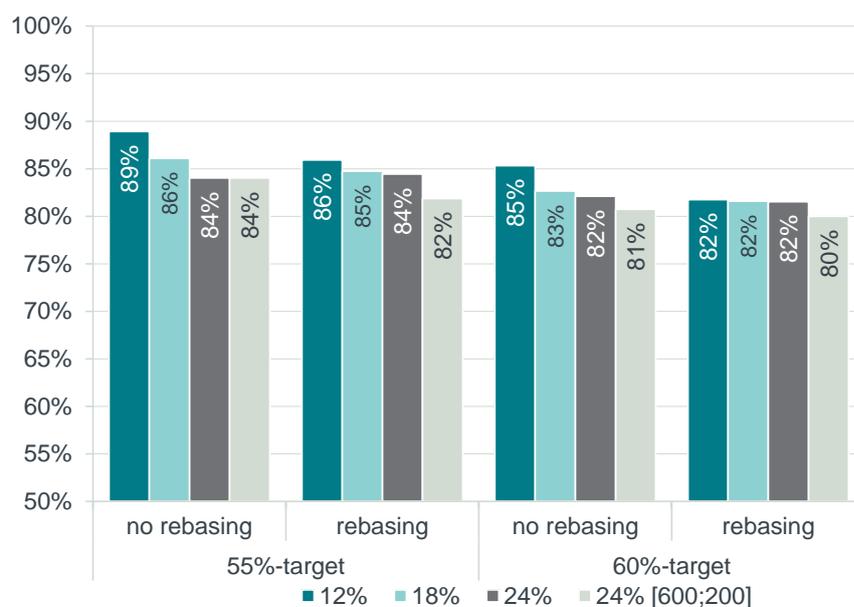
- Based on the **55% target**, effective supply decreases to 89% to 84% of BAU supply without rebasing and to 86% - 82% with rebasing, depending on the parameters of the MSR.
- Based on the alternative scenario of a **60% target**, supply would amount to 85% - 81% of BAU without rebasing and to 82% to 80% with rebasing.

Therefore, scenarios that combine an increase of the LRF with rebasing lead to a more consistent reduction of supply: The TNAC is reduced more quickly due to the rebasing, this in turn leads to a lower leverage of the MSR. Hence, market outcomes are less dependent on the configuration and interventions of the MSR. (**Figure 6**, colours of bars represent different intake rates of the MSR).



Rebasing the cap in 2025 in combination with a moderate increase of the LRF brings the ETS in line with the Green Deal

Figure 6. Effective supply 2021-2030 vs. BAU (% of BAU)



Source: Frontier Economics

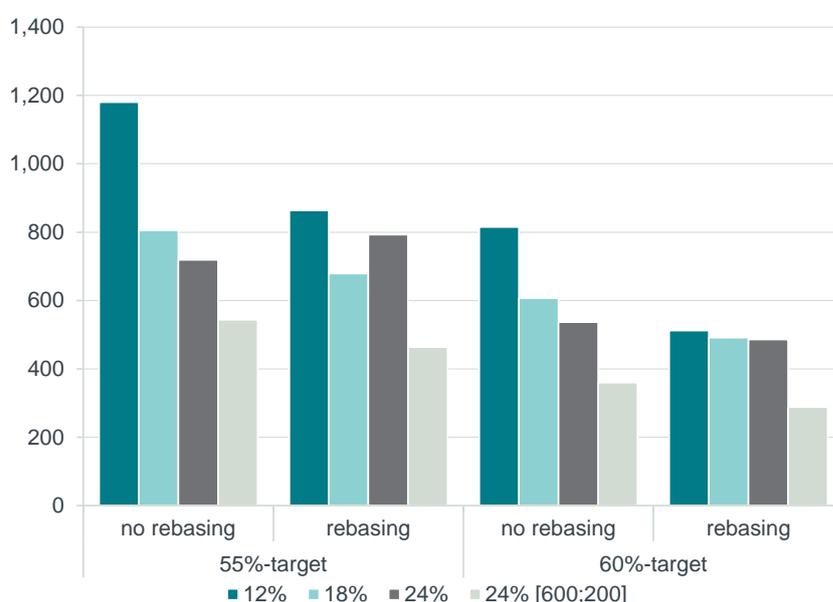
Note: y-axis capped at 50%; effective supply in BAU 11.8 GtCO₂

Higher intake rates for the MSR reduce surplus towards the end of the trading period

Higher intake rates increase the stock of the MSR and hence lead to more allowances being cancelled. Through this mechanism, overall supply is reduced. Maintaining a higher intake-rate after 2023 of 18% or 24% not only reduces new supply of allowances, it also lowers the number of allowances that will be in circulation towards the end of trading phase IV, especially if coupled with a reduction of the thresholds from [833;400] to [600;200].

Reform scenarios that rely on an MSR intake rate of 12% after 2023 still show a relatively high number of allowances in circulation even in 2030 (**Figure 7**).

Figure 7. Total number of allowances in circulation 2030 (million tCO₂)



Source: Frontier Economics

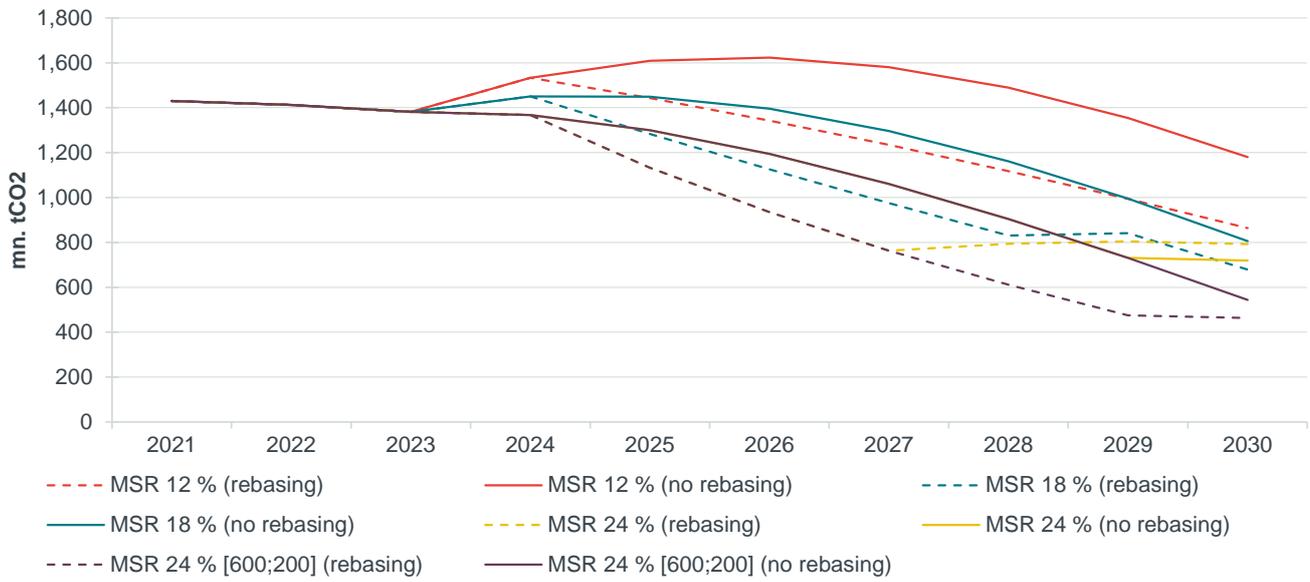
Note: TNAC in BAU scenario of 2.3 bn tCO₂

Especially if the 55%-target is implemented without rebasing, choosing a higher intake rate above 12% seems appropriate to lower the structural surplus in the long-run (**Figure 13**). However, high intake rates could lead to an oscillation of auction volumes if the interventions of the MSR vary from year to year. As a result, the market would become less predictable and prices more volatile.



Thresholds and intake rate of the MSR should also be part of the review of the ETS

Figure 8. Comparison of TNAC over time (2021-2030; 55% target)



Source: Frontier Economics

6. AUCTION VOLUMES WILL DECREASE, MEMBER STATES' REVENUES LIKELY TO REMAIN STABLE AS PRICES RISE

30 to 50% less auctioning of certificates in 2030

A reduction of the ETS cap in line with the -55% target would cut auction volumes by half compared to today

Reducing the cap of the ETS will naturally lead to less certificates being auctioned by Member States. This could give rise to concerns of Member States about losing income due to lower auction volumes.

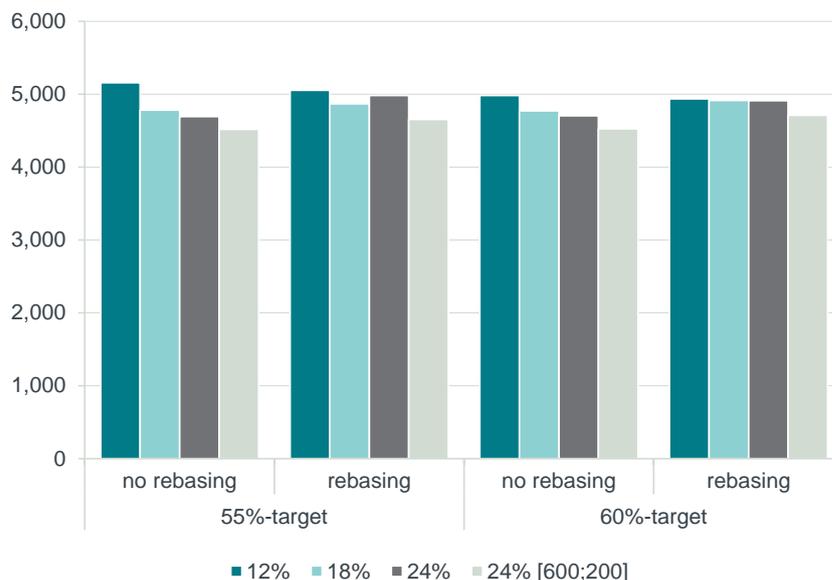
Development of auction volumes determined by choice of reform option

The choice of reform options influences the number of allowances available in auctions. Scenarios that combine an increase of the LRF with rebasing lead to relatively higher auction volumes, compared to their non-rebasing counterparts (**Figure 9**):

- **Higher MSR intake-rates reduce auction volumes:** Due to the functioning of the MSR, only auction volumes are affected. Scenarios that put more emphasis on the intervention of the MSR, those without rebasing, lead to lower absolute volumes available in auctions.
- **Rebasing of the cap affects both free allocation and auction volumes:** The parallel shift of the cap through rebasing affects both channels of supply: free allocation and auctioning. Therefore, the comparison of scenario with and without rebasing shows that rebasing scenario lead to higher auction volumes all else being equal.

In the long run, all scenarios foresee a significant decline in auction volumes compared to the number of allowances auctioned today:

- Even without any reform, auction volumes would decrease from ca. 700 mn. tCO₂ today to less than 500 mn. tCO₂ in 2030.
- Based on the 55%-target for 2030, auction volumes would fall by -30% to -50% compared 2020, depending on the parameters of the MSR and the choice of rebasing.
- If a 60%-target would have been chosen, auction volumes would have decreased even more strongly by -30% to -60% of today's auction volumes.

Figure 9. Cumulative auction volumes (mn. tCO₂) 2021 until 2030

Source: Frontier Economics

Note: auction volumes in BAU 5.7 bn. tCO₂



A tighter cap of the ETS induce upward pressure on prices

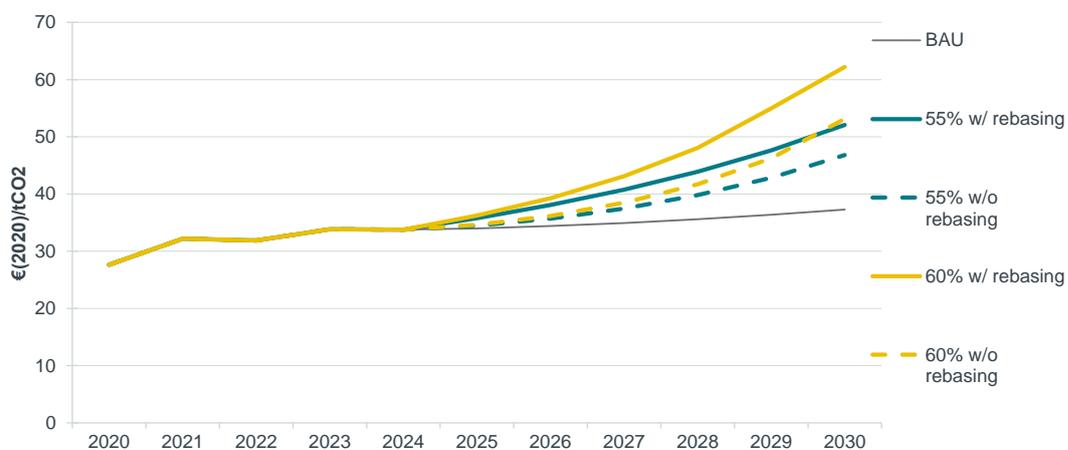
Price effects likely to compensate Member States for lower volumes

ETS prices exhibit a high level of sensitivity to changing political influences: Prices remained very low during an extended period of oversupply in the third trading phase until the MSR was established to overcome the structural inflexibility of supply. With increasing scarcity following reforms, price increases can be expected.

We model the development of ETS prices based on historical correlation between prices, market surplus, economic output (EU gross domestic product) and switching costs in the power sector (CO₂ price required for coal-to-gas switch).

The results can be summarised as follows (**Figure 10**):

- In the **BAU scenario**, more or less constant price levels, despite the remaining surplus (**Figure 1**) and mainly based on an assumed increase in economic activity.
- Rebasing of the cap leads to a tightening of the demand-supply balance, which reduces the number of allowances in the medium-to longer-term. Based on the current MSR settings and a **55% target**, a price range between **47 and 53 €₂₀₂₀/tCO₂** in 2030 is expected, depending on the implementation of rebasing.
- In line with higher overall ambitions, a **60% target** would result in higher price levels of **53 to 63 €₂₀₂₀/tCO₂**.

Figure 10. Modelled prices in the EU ETS, depending on Reform options

Source: *Frontier Economics*

The reform scenarios shown are based on an MSR intake rate of 12% after 2023

The price effects compensate for the drop in auction volumes, and absolute auction revenues of Member States remain in line with results expected absent reforms: Expected auction revenues vary between 95% of BAU revenues (55% target, no rebasing and 12% MSR intake rate after 2023) and 112% (60% target, rebasing and 24% intake rate / lower thresholds).

7. PRICE INCENTIVES FOR INVESTMENTS IN DECARBONISATION OF THE INDUSTRY NOT SUFFICIENT

A small number of industrial production processes account for a large share of the industrial CO₂ emissions within the EU ETS. For example, the production processes for steel, cement and bulk chemicals are amongst the biggest ETS emitters with total verified emissions of 276 mn. tCO₂ in 2019.⁶ These **three sectors emit ca. 48% of all industrial emissions.** (574 mn. tCO₂, excl. fuel combustion⁷) and ca. 18% of total ETS emissions in 2019 (ca. 1,500 mn. tCO₂).⁸

Costs of CO₂ abatement in the industry remain high

The processes underlying the production of steel, cement and chemicals thus offer a **high potential for the abatement of CO₂ emissions** within the industrial sector. A comparison of the abatement costs⁹ with the projected CO₂ price levels in the EU ETS reveals a significant **gap between the projected and the required CO₂ prices** for the abatement options to be realised:

- For the production of **steel**, low carbon hydrogen can be used as a reducing agent instead of coke in the blast furnace. The **hydrogen direct reduction** implies estimated abatement costs between **99 and 165 €/tCO₂** in 2030.
- The CO₂ emissions for the production of **cement** can be reduced by employing **combustion processes with a mixture of oxygen and recycled CO₂** (e.g. through carbon capture and storage, CCS). The estimated abatement costs for this process range from **70 to 131 €/tCO₂** in 2030.
- In the production of **chemicals** green hydrogen can be used to reduce CO₂ emission, for example in the production of ammonia



Abatement costs for important industrial processes will most likely not be covered by ETS prices until 2030

⁶ The production of pig iron or steel accounts for 119 mn. tCO₂ emissions in 2019; the production of cement clinker accounts for 120 mn. tCO₂ emissions in 2019; and the production of bulk chemicals accounts for 36 mn. tCO₂ emissions in 2019.

⁷ Verified emissions from industrial installations including fuel combustion amounted to 738 mn. tCO₂ in 2019.

⁸ Source: ETS Database V38

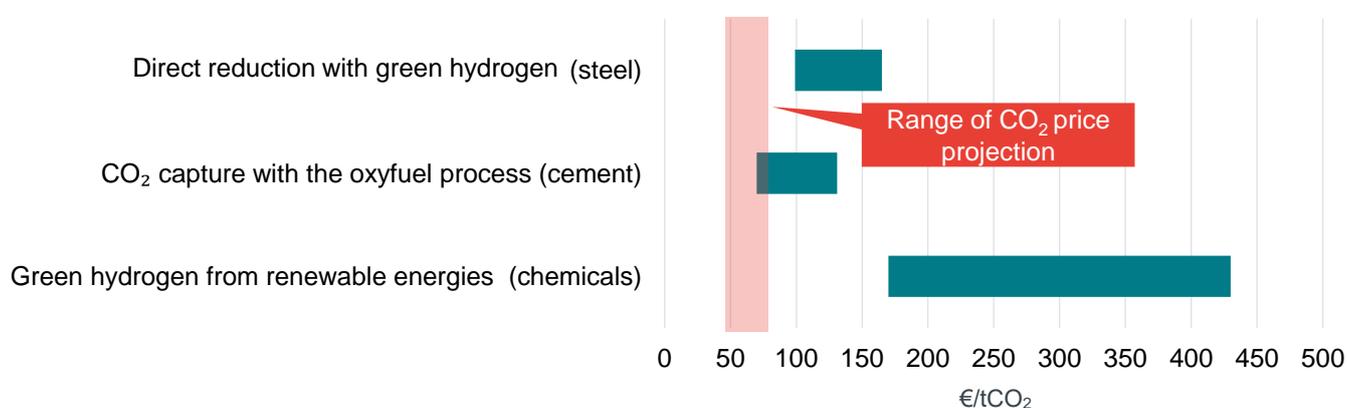
⁹ Abatement costs describe the required CO₂ price (in €/tCO₂) to trigger investments into low carbon technologies.

or plastics. The use of **green hydrogen** implies abatement costs between **170 and 430 €/tCO₂** in 2030.¹⁰

The **CO₂ price indication for 2030 ranges from 37 to 75 €/2020/tCO₂** across all modelled scenarios. The price indication for the central scenarios shows a range between 46 and 62 €/2020/tCO₂ in 2030 (see Section 6).

The estimated abatement costs of the described industrial processes in the steel, cement and chemical production are generally higher than the CO₂ price indication for 2030 (see Figure 11). In this framework, it is **unlikely that a deep decarbonisation of these industries will be triggered by the EU ETS by 2030**.

Figure 11. Abatement cost of key technologies in 2030 (Germany) and CO₂ price projection (€/tCO₂)



Source: Frontier based on Agora Energiewende und Wuppertal Institut (2019): Klimaneutrale Industrie: Schlüsseltechnologien und Politikoptionen für Stahl, Chemie und Zement, McKinsey: Decarbonization challenge for steel

Carbon Contracts for Difference could close the price-cost gap

As a result, from today's perspective there is a **need to bridge the price-cost gap** if investments into the low carbon technologies outlined above are to take place until 2030.

A possible instrument to bridge the investment gap are **Carbon Contracts for Difference (CCfD)**, which (dynamically) subsidises investments into the abatement technologies of specific industries.¹¹ While a CCfD can provide certainty for investors, it does not reduce the risk of carbon leakage as it only covers the difference between the ETS price and the costs to decarbonise.

¹⁰ Agora Energiewende und Wuppertal Institut (2019): Klimaneutrale Industrie: Schlüsseltechnologien und Politikoptionen für Stahl, Chemie und Zement, McKinsey: Decarbonization challenge for steel.

¹¹ In simple terms, a CCfD pays for the difference between the CO₂ price in the EU ETS and the required CO₂ price to trigger the investment ("strike price") into the low carbon technologies. If the EU ETS price exceeds the strike price, then the beneficiary of the CCfD has to "pay back" the difference between the CO₂ price in the EU ETS and the "strike price".

8. THE CURRENT FRAMEWORK TO PROTECT INDUSTRY FROM CARBON LEAKAGE WILL LOSE ITS GRIP WITH DECREASING OVERALL VOLUMES

The EU ETS has an impact on the cost of energy-intensive industry in two ways: through the direct costs of emission (i.e. the cost of allowances that need to be surrendered), and through higher power prices if CO₂-costs are passed-on by power suppliers.

In order to limit the risk of competitive distortions, there are two mechanisms that compensate those sectors that are deemed to be exposed to a risk of carbon leakage: Direct costs are compensated for by the free allocation of a certain share of the required number of allowances, and indirect costs are partially covered through state aid falling under the responsibility of the Member States.

Carbon leakage protection through free allocation will lose effectiveness in shielding industry from carbon costs

The total number of allowances that are available for free allocation is limited by the auction share, currently 57% of the annual cap. If the sum of free allocation volumes exceeds the share of 43%, the cross-sectoral correction factor is applied and the individual allocations are reduced in line with the 43% share.

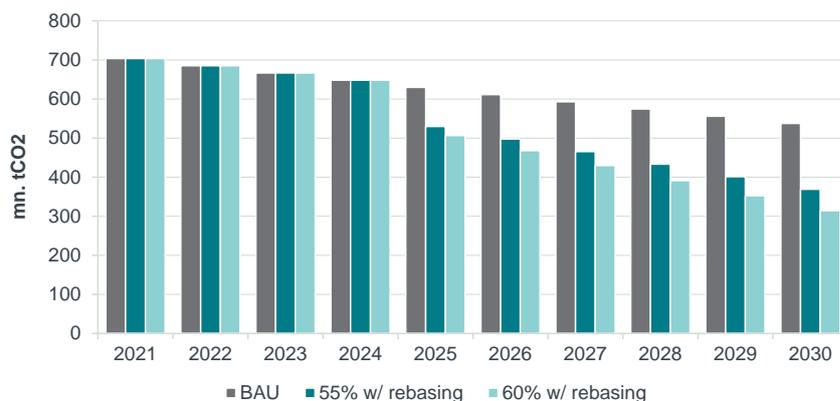
While different configurations of the MSR do not influence the number of allowances available for free allocation, the reduction of the overall cap of decreases volumes (**Figure 11**) depending on the target and choice of rebasing:

- **BAU:** Free allocation volumes decrease in line with an LRF of 2.2% by 30% compared to 2020
- **55% target (with rebasing):** Free allocation volumes decrease by 50% compared to 2020
- **60% target (with rebasing):** Free allocation volumes decrease by 60% compared to 2020.

A reduction of the cap using a higher LRF but without rebasing leads to 4-5% higher volumes available for free allocation over the course of trading phase IV (not included in the graph below).



Aligning the ETS with the Green Deal will also result in a lower number of allowances available for free allocation

Figure 12. Development of volumes available for free allocation (based on 57% auction share)

Source: Frontier Economics

Note: 55% and 60%-target reform scenarios based on 12% MSR intake rate after 2023

It is evident that the current system of carbon leakage protection will lose its grip and industrial sectors in the EU might face increased competitive disadvantages vis-à-vis their international rivals.

As an alternative to shield EU industrial sectors from the costs of carbon trading, the EU Green Deal proposes the introduction of a **Carbon Border Adjustment Mechanism (CBAM)**, the exact details of which should be developed over the course of 2021.

CBAM could be an alternative, their design raises important practical challenges

The Commission has not yet spelt out its CBAM proposals in detail. However, the EC consultation in 2020 requested input on the following important questions:

- **Type of policy instrument:** “The legal and technical feasibility of each measure will need to be carefully assessed, also in relation to the EU’s trade acquis (the rules of the World Trade Organisation and EU’s trade agreements) and other international commitments. The complementarity of the measure with internal carbon pricing, in particular the EU ETS, will also have to be assessed, as well as how it relates to the current measures to avoid the risk of carbon leakage.”
- **Methodological approach to evaluating the carbon content and carbon pricing of imported products:** “Under the EU ETS, a system of harmonised EU-wide benchmarks has been developed for industrial processes. To the extent that a sector is covered by the EU ETS, a border measure could be based on similar methodological considerations as for ETS, i.e. benchmark values, unless the exporter certifies a lower carbon content and/or a higher carbon cost at origin. The Commission will also look at alternative approaches, e.g. defining carbon

content of products, taking into account their interaction with existing and future climate policies.”

- **Sectoral scope:** “An important part of the work will also relate to the selection of sectors subject to this measure. A scoping in terms of sectors concerned will have to be defined to ensure that the measure applies where the risk of carbon leakage is the highest. The assessment will take as starting point the study currently underway that the Commission launched to identify the risk of carbon leakage in the third and fourth trading phases of the EU ETS.”

While the Commission seems to be aware of some of the potential challenges, other important issues will need to be addressed to make such a system work:

- **Compatibility with WTO rules and economic efficiency require a certain level of accuracy** – The CBAM proposal as proposed by the EC mirrors the approach taken with regard to indirect taxes such as VAT. However, there are important conceptual differences between traditional indirect levies and taxes that apply to embedded carbon. The key requirement is that the adjustment mechanism must not be seen as a form of disguised protectionism by imposing an excessive burden on imports into the EU and/or on some trade partners relative to others.
- **How to deal with inputs and end products?** One of the complications in fine-tuning the adjustment mechanism is deciding which products should be covered. The Commission has suggested, as a starting point, taking those that fall within the scope of current carbon leakage protection rules. However, if not all end products are to be covered, care will be needed in implementing a CBAM to avoid creating new distortions to trade.
- **How to calculate embedded carbon emissions in product life-cycle analysis?** There are many different ways to calculate the carbon footprint of a product based on life-cycle analysis. A decision of the scope of the assessment has to be taken with care in order to not give rise to creative tax avoidance strategies by importers.
- **How to keep the costs of bureaucracy manageable?** While answering all of the questions above and maybe more, the administrative burden on companies should be remain manageable.

A CBAM could in theory be an **effective shield for domestic industry** and the first step towards putting a price tag on emissions in other regions that occur due to consumption in Europe. In conjunction with export rebates it could also help domestic industry to compete in foreign markets on a level playing field. However, to



Carbon Border
Adjustment Mechanisms
could provide an
alternative shield to
protect domestic industry

ensure a CBAM which is both workable and acceptable to international partners, complex political and design issues will need to be worked through.

9. SECTOR EXPANSIONS PROVIDE OPPORTUNITIES, HOWEVER, SHOULD BE EVALUATED WITH CARE



Maritime navigation is a likely candidate for an ETS extension and a “soft link” to stationary installations

As part of the reform of the EU ETS the extension to the **maritime, road transport and building sectors** is considered. While there are benefits to the extension of the EU ETS, the extension should be assessed carefully, since an inappropriate implementation could lead to distortions in the sensitive EU ETS market.

Expanding the EU ETS to new sectors **can increase the overall efficiency of decarbonisation** in the EU from an economic perspective. A sectoral extension of the EU ETS means that more sectors are subject to an explicit carbon pricing (e.g. the maritime sector is not currently subject to carbon pricing). Further, a sectoral extension (including bi-directional tradability of allowances) means that a uniform CO₂ price applies across multiple sectors so that the most efficient decarbonisation options are used.¹²

An extension of the EU ETS to other sectors can also **increase the resilience of the EU ETS** in the medium and longer term. In particular, an extension would increase the liquidity through a larger number of companies that are required to buy and submit certificates. Supporting the liquidity of the EU ETS will be increasingly important as an increasing amount of abatement options in the electricity sectors are exhausted as e.g. conventional power plants leave the electricity and thereby the ETS market.

The decision to expand the ETS to other sectors and the degree of integration should consider the comparability of abatement options

A potential sectoral extension should be evaluated and developed carefully as the impact of an extension depends on a number of factors. While there might be operational differences between sectors (e.g. whether the carbon pricing applies at upstream or downstream level), a number of drivers of the impact on the EU ETS can be identified:

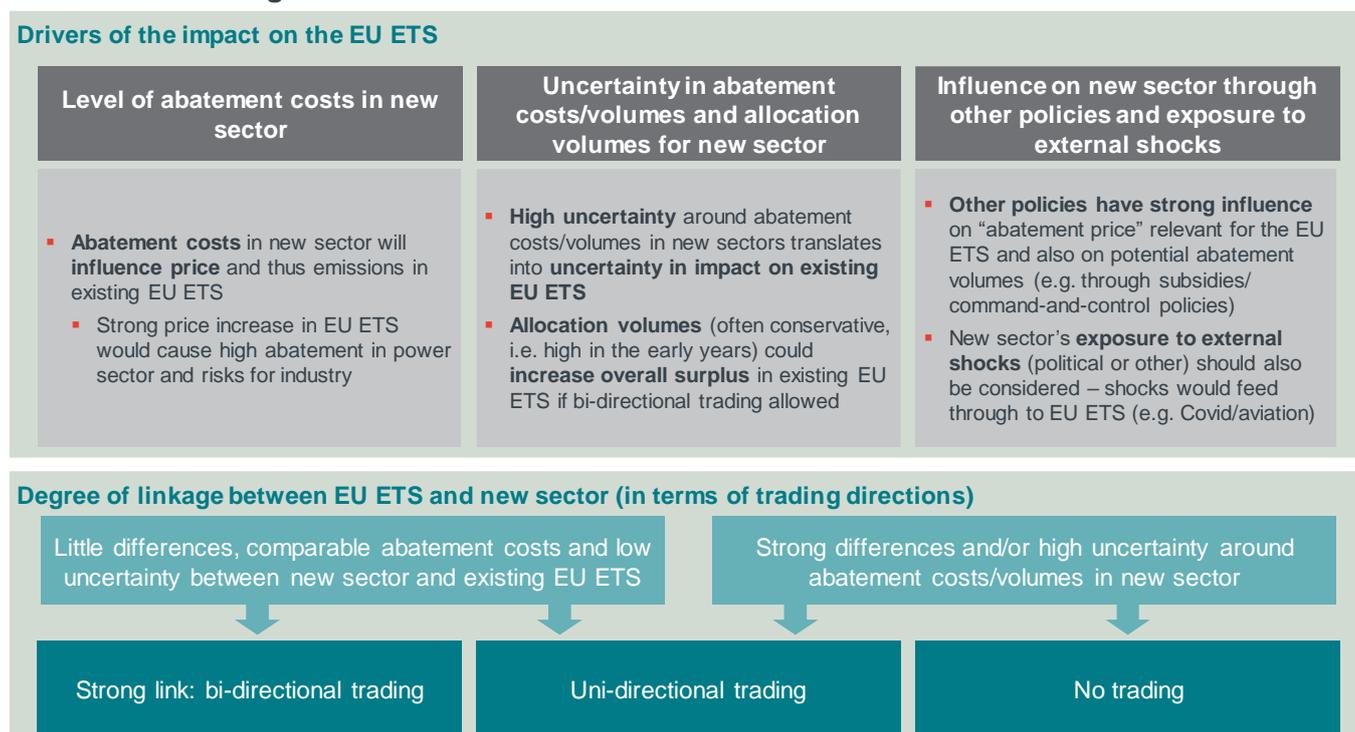
- The **level of abatement costs** within a “joining” sector needs to be assessed carefully relative to the level of abatement costs within the “existing” stationary sectors. In combination with the

¹² Nevertheless, there is scope to differentiate in the treatment of sectors, e.g. through different rules of the certificate grandfathering/tendering share.

demand and supply balance of the “joining” sector, this will influence the structure of the abatement options (and relevant costs) within the EU ETS.

- The **uncertainty in a sector’s abatement costs and volumes** translates into an uncertainty around the CO₂ prices within the EU ETS. This uncertainty may be reflected in a sector’s (e.g. generous) **allocation volumes** which could increase the overall surplus of certificates in the existing EU ETS if bi-directional trading is allowed (see below).
- The transport and building sectors are **already subject to a number of climate policy frameworks**¹³, which need to be considered in assessing the impact of a sectoral extension on the EU ETS. Other policies can have a strong influence on the “residual abatement price”¹⁴ relevant for the EU ETS and also on the potential abatement volumes.
- The **exposure of a sector’s output (and emissions) to external shocks** (political or other) influences the (in)stability of the carbon pricing within the EU ETS.

Figure 13. Drivers of the impact on the EU ETS and strategies to link “joining” sectors with the existing EU ETS



Source: Frontier Economics

¹³ For example, the RED II mandates a quota on the renewable share in fuels for transport systems or the Energy Efficiency Directive mandates measures for the buildings sector.

¹⁴ The “residual abatement price” refers to the CO₂ price that is necessary to trigger an investment into an abatement option after other (e.g. implicit) carbon pricing is taken into account, which could be the result of other policies (e.g. the German national emission trading scheme, nEHS, which applies to the building/heating sector).

- To accommodate for the uncertainty within all of these drivers, the **degree of linkage between ETS sectors** (with a focus on certificate trading possibilities¹⁵) can be varied accordingly: Strong differences in the structure of the abatement cost curve or particularly high uncertainty around the abatement costs and volumes of the “joining” sector could mean that **limited or no trading of certificates** between the “existing” and “joining” sectors is favourable. The extension of the EU ETS to the aviation sector followed such an approach by limiting the validity of certificates: The aviation sector can use allowances from the stationary EU ETS, however this is not possible the other way around. As a result, the risk of (e.g. generous or strict) allocation volumes (for the aviation sector) on the EU ETS was limited.
- If there are little differences, comparable abatement costs and low uncertainty between the “joining” sector and the “existing” EU ETS a full link and thereby bi-directional certificate trading can be considered. The same holds, if significant abatement cost differences between sectors exist and cost efficiency of CO₂ abatement is the core target: The efficiency of the system increases, however, at the expense of sectors with high costs that may observe a slower uptake of CO₂ abatement technologies.

Policy makers should act with care given the sensitive reaction of the ETS to changing rules and regulations

An extension of the EU ETS to other sectors such as maritime, transport and building therefore comes with benefits and risks for the objective to effectively decarbonise our economy in an efficient way. These will have to be carefully assessed with a focus on abatement technologies, costs and volumes for each of the “joining” sectors. To mitigate uncertainties and adverse impacts on the existing decarbonisation process within the EU ETS it is possible to limit the trading directions between the sectors before pursuing a fully-fledged integration into the EU ETS.

In the past, the ETS has proven to react sensitively to changing rules and regulations. At the moment, with increasing prices for CO₂, the ETS is providing more meaningful signals for decarbonisation than it did over the course of the past decade. Policy makers would be advised to decide prudently on structural changes of the system, like integrating new sectors.

¹⁵ This can be implemented through a selected validity of certificates for specific sectors.

