



European instruments aimed at reducing greenhouse gas emissions

The European Commission's "Fit for 55" legislative package aims to equip the European Union (EU) with the means to reach climate neutrality by 2050 by reducing greenhouse gas emissions. It proposes (i) to revise the emissions trading system to set a higher carbon price, (ii) to set up a carbon border adjustment mechanism at the EU's borders to reduce "carbon leakage" and (iii) to encourage third countries to commit to reducing their emissions. The characteristics of these mechanisms pose several challenges: succeeding in decarbonising economies while preserving the competitiveness of European companies, complying with the rules of the World Trade Organization and the EU's other international requirements, and cushioning the macroeconomic and social impacts. The French Presidency of the EU, which ended last June, made significant progress in these priority areas.

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96.9 EUR/tonne of CO₂

maximum price reached by the emission allowance (peak in February 2022)

+250%

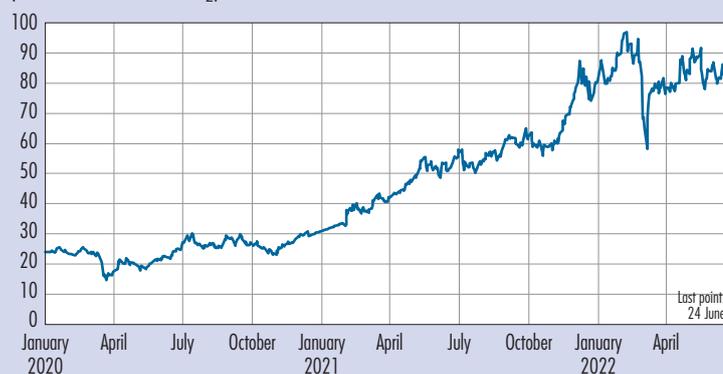
price increase since the beginning of 2020

-31%

in 2020, decrease in CO₂ emissions in the European Union since 1990

Allowance price in the EU Emissions Trading System (EU ETS)

(in EUR/tonne of CO₂)



Source: Trading Economics (EU Carbon Permits).



The urgent need for action on climate change, confirmed by the latest report of the Intergovernmental Panel on Climate Change (IPCC), has been internationally acknowledged since the Kyoto Protocol (December 1997). Following the Paris Agreement (December 2015), the first legally binding climate agreement, the international community agreed to limit the global temperature increase to well below 2°C compared to pre-industrial levels. In December 2019, the European Union (EU) published the Green Deal, which, through the European Climate Law of 30 June 2021, aims to make Europe climate neutral by 2050 by reducing greenhouse gas (GHG) emissions, the main one being CO₂.

Global CO₂ emissions reached an all-time high of 36.3 billion tonnes in 2021.¹ China, India and emerging economies are among the fastest growing contributors (see Chart 1), with the EU accounting for only about 10% of direct emissions, decreasing slightly. However, the EU needs to pursue its transition in certain high-emitting sectors

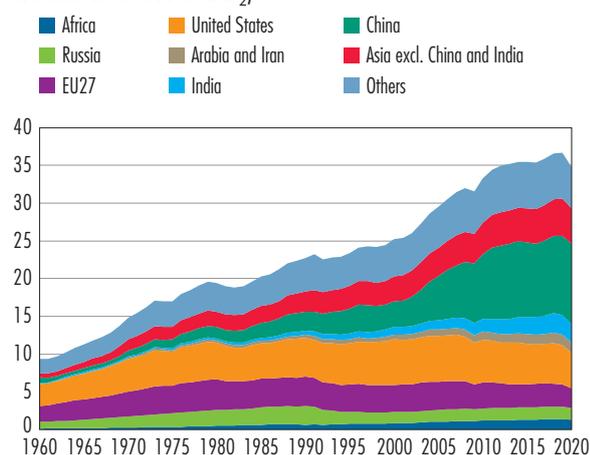
(transport – EEA, 2021) and to play a leading role in encouraging the major economies to take climate issues into account.

In order to achieve this, Europe already has an instrument at its disposal: the EU Emissions Trading System (EU ETS). However, two problems remain:

- The first concerns the scope of application and the price of the carbon allowance: the decarbonisation of economies requires that this price be both high and predictable to enable companies to build their investment strategies. To achieve this, the EU ETS must be extended and revised.
- Furthermore, while the production of GHGs in Europe has decreased, the carbon footprint (i.e. the GHGs contained in the products consumed) remains almost unchanged due to the increase in emissions associated with imports. To address this issue, the EU decided to introduce a Carbon Border Adjustment Mechanism (CBAM), the aim of which is to reduce the bypassing of reductions or carbon leakage.²

C1 Global CO₂ emissions

(in billions of tonnes of CO₂)



Sources: Global Carbon Atlas, based on Friedlingstein et al. (2021) and on Andrew and Peters (2021).

1 Why and how should a carbon price be set?

The economic foundations

In order to steer investment and consumption behaviour towards activities that emit less GHGs, an economically efficient instrument is to provide a carbon price signal that increases over time. This price makes it possible to calibrate the cost of GHG emissions to society as a whole and to encourage governments to reduce their consumption, particularly of oil and coal. Such a price makes it possible to place the burden of collective damage to the environment on those who are responsible for it, according to the “polluter pays” principle. By internalising the cost of this negative externality,³ the carbon price also stimulates technological innovation: any economic agent who can

1 International Energy Agency, 8 March 2022.

2 Carbon leakage occurs when a company decides to relocate its production to another country with less stringent GHG emission limitation rules in order to avoid the climate policy related costs at its production site. This is likely to reduce the effectiveness of the local scheme and lower the reduction in emissions at the global level.

3 A negative externality refers to the act of consumption or production by one agent that has a negative impact on the situation of another agent, without this relationship being subject to monetary compensation (see <https://www.economie.gouv.fr/facileco/arthur-pigou>).



avoid emitting GHGs, for example by changing their mode of production at a price lower than the carbon price, will have an incentive to do so. Economic analysis suggests two main ways of bringing about this price: setting up a tax (a “price instrument” according to the idea of Arthur Pigou in the 1920s) or creating an emission allowance market (a “quantity instrument” according to the idea of Ronald Coase in the 1960s).

The principle of greenhouse gas emission allowances in the European Union

In the European Union, GHG emission reduction targets are enshrined in climate and energy packages. The most recent one, which was concluded in 2018 before the Green Deal, set a target of a 40% reduction compared to 1990 by 2030. This target was broken down into a 43% GHG emission reduction target compared to 2005 for the sectors covered by the EU ETS (around 45% of the EU’s GHG emissions)⁴ and 30% for other sectors. Since July 2021, the “Fit for 55” package aims to provide the EU with the means of achieving climate neutrality

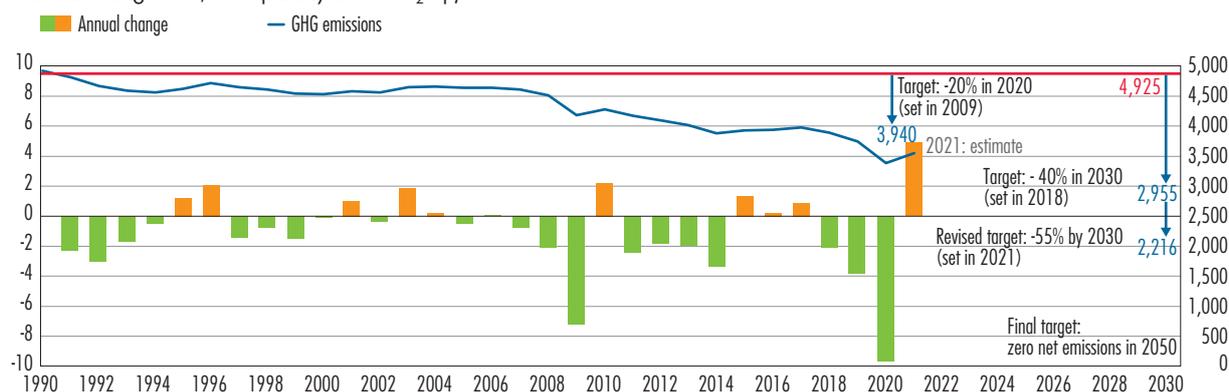
by 2050. This requires an intermediate reduction in GHG emissions of at least 55% by 2030 (see Chart 2).

The EU ETS, introduced in 2005 to help meet the Kyoto Protocol’s targets,⁵ has grown in four phases, each expanding the sectors covered and tightening the way allowances are acquired. Phase 4 (2021-30) initially included the transposition of the 2030 climate and energy package, but now aims to implement the targets of the “Fit for 55” package.

The EU ETS operates mainly in the EU countries⁶ and caps the emissions from about 12,000 installations in the energy sector, energy-intensive manufacturing industries, and aviation for intra-European flights. It is a so-called “cap and trade” system: a theoretical overall cap on GHG emissions, which is lowered over time at a pre-determined rate, is set each year; below this cap, GHG emitters receive emission rights free of charge or buy them at auction; they can also trade them on a secondary market. At the end of the year, each company must surrender enough allowances to cover all its actual emissions, or face heavy fines.

C2 Greenhouse gas emissions (CO₂ equivalent): achievements and targets for the EU-27

(lhs: annual change in %; rhs: quantity in MtCO₂eq.)



Sources: European Environment Agency, authors’ projections.

Note: The red line shows the amount of emissions in 1990 (4,925 MtCO₂eq.), which is used as the basis for calculating the target reductions.

4 The remaining 55% of emissions (housing, road and rail transport, agriculture, etc.) are covered by the Effort Sharing Regulation (ESR), which sets out the overall target in terms of national GHG emission reduction targets.

5 20% reduction of six GHG emissions in 2020 (compared to 1990 levels).

6 27 EU countries plus Iceland, Liechtenstein, Norway.



Overview: a carbon price that has long been too low

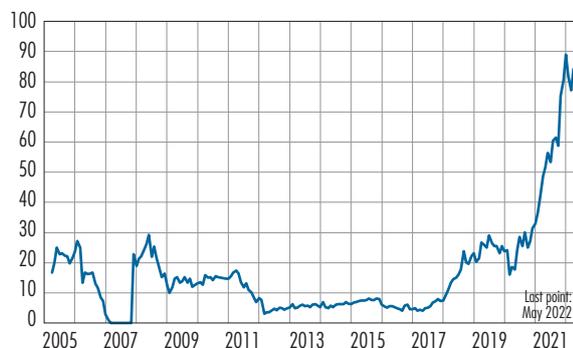
The fact that the EU has so far managed to meet its GHG emission reduction targets is not due to any pressure from the EU ETS. For almost fifteen years, the EU ETS has failed to set a sufficiently high and predictable carbon price (see Chart 3), for several reasons: an initial oversupply of allowances compared to actual needs; the consequences of the 2008 economic crisis; and (too) many free allocations in an attempt to counteract carbon leakage.

A large surplus of allowances in circulation has built up and has weighed on the carbon price. In 2020, it still amounted to the equivalent of one year's worth of emissions, or 1,600 million allowances (see Chart 4). This surplus led to the creation of the Market Stability Reserve (MSR), implemented in January 2019. Its purpose is to ensure understanding and anticipated increases in the carbon price for installations covered by the EU ETS by adjusting, according to stringent rules, the number of allowances in circulation. By the end of 2019, in the face of this oversupply, the price had only reached around EUR 25 per tonne of CO₂.

It was not until mid-2020 that the price began to rise, until it reached more than EUR 90 per tonne of CO₂ at the beginning of 2022, a price compatible with the ambition of the energy transition.⁷

C3 Price of emission permits in the EU Emissions Trading System

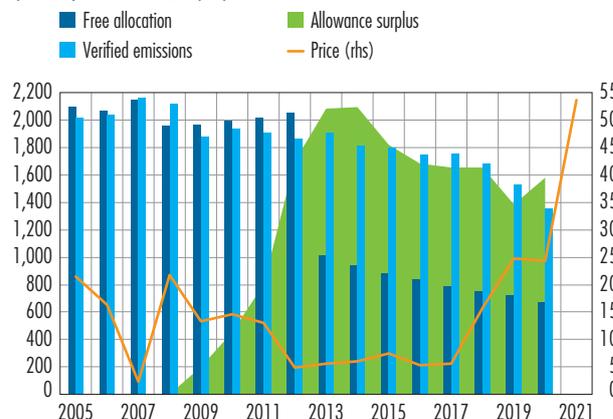
(in EUR/tonne of CO₂)



Source: Trading Economics (EU Carbon Permits).

C4 Free allocation of allowances and verified emissions in the European Union

(quantity in MtCO₂eq., prices in EUR/tonne)



Sources: European Commission, European Environment Agency (EU Emissions Trading System [EU ETS] data viewer), Trading Economics (EU Carbon Permits).

Several factors can explain this increase:

- phase 4 reforms (expansion of the auctioning system, increased use of the MSR implemented in 2019);
- the post-Covid rapid recovery in activity, which is accompanied by strong demand for allowances;
- the expected tightening of supply following the proposed 2021 EU ETS review in the context of the "Fit for 55" package;
- the rise in the price of gas, which has led energy-producing companies to turn to coal (with greater GHG emissions), mechanically increasing the demand for allowances and their price.

At this price level, unseen since 2005, some believe that a form of speculation may have developed on the market, which would justify increased surveillance. However, in a November 2021 report, the European Securities and Markets Authority (ESMA) considered that hedge funds had not deliberately driven up the price of allowances and that the market was functioning normally. As confirmed more recently by the ECB (2022), the structure of the

⁷ The Stern-Stiglitz report (2017) estimated that "a USD 40-80 price range in 2020, brought up to USD 50-100 by 2030, was consistent with the objective of the Paris Agreement. The Blanchard-Tirole Commission (2021) recommended an initial floor price of EUR 60 per tonne in 2021, raised by 4-5% per year.



market has changed little since 2018 even though the size has doubled.

However, in view of the new European climate-related commitments to achieve carbon neutrality by 2050, it is now necessary to adapt the allowance market to make it more efficient. The revision of the EU ETS and the creation of the CBAM are part of the new legislative provisions included in the “Fit for 55” package. The adoption of general approaches⁸ by the Council on the CBAM and the revision of the EU ETS were a major step forward achieved under the French Presidency of the EU. However, at this stage, these texts do not settle all the – often essential – details of these mechanisms, nor the differences of opinion with the European Parliament. The new directives can only be finally adopted by the Council once the work carried out in trialogues⁹ since mid-July 2022 and until the end of the year has been completed.

2 The new European provisions for combating global warming

One of the measures in the climate package proposed by the European Commission is the revision of the EU ETS in order to increase its scope and effectiveness.

Main revisions to the EU Emissions Trading System (EU ETS)

The revisions to the EU ETS involve changes to several parameters:

- a 61% reduction in GHG emissions by 2030 compared to 2005 (previously 43%);
- a faster annual decrease in the overall number of emission allowances in circulation (4.2% compared to 2.2%);

- a decline (in principle) in free allocations (43% of the total in 2021), but the pace remains a subject of tense discussion;
- an adjustment of the MSR to absorb the historical surplus of allowances more rapidly and ensure market stability;
- further structural changes: inclusion of maritime transport in the EU ETS and extension to the road transport and construction sectors from 2025. 25% of the revenues from this new system will be paid as an own resource to the EU budget.

In order to soften the impact of the new EU ETS on the most vulnerable households, a proposal has been made to create a Social Climate Fund, to be funded by 25% of the revenues from the new road transport and construction sector allowances (estimated at EUR 72 billion over the period 2025-32, through the EU budget) and by contributions from Member States. In order to benefit from the funds, Member States will have to submit “social climate plans” by June 2024, detailing the nature and amount of their spending and measures to combat energy poverty. These various adjustments will result in new allocations for the revenues derived from the auctioning of emission allowances. These revenues will contribute to the financing of the Modernisation, Innovation and Social Climate Funds, will be added to the EU budget to finance the NextGenerationEU (NGEU) recovery plan and will help Member States to develop their climate and energy projects (see Appendix).

Creation of a Carbon Border Adjustment Mechanism (CBAM)

Although carbon emissions have dropped markedly within the EU, it is still the world’s largest importer of GHGs (around one third of its carbon footprint). In order to

⁸ Pending the Parliament’s position at first reading, which is necessary for the adoption of the Council’s final position, the Council may adopt a political agreement, known as a “general approach”, and thus help to speed up the legislative procedure. Accordingly, several Commission proposals under the “Fit for 55” framework have been adopted, including the CBAM on 29 June (Council of the EU, 2022).

⁹ Trialogues are inter-institutional negotiations between representatives of the Parliament, the Council and the Commission, the aim of which is to reach a provisional agreement on a text acceptable to both the Council and the Parliament with a view to its final adoption.



overcome this difficulty, the Council of the EU reached an agreement (by general approach), under the French Presidency, on the broad terms of the regulation establishing a CBAM on 15 March 2022.¹⁰ On 22 June, the European Parliament adopted its position and called for a broadening of the scope, a faster implementation and the abolition of free EU ETS allowances by 2032.

A sophisticated mechanism

The CBAM is an essential complement to the EU ETS. It aims to prevent carbon leakage by requiring EU importers of products from third countries to purchase certificates whose price will be indexed to that of the EU ETS. The aim is to encourage exporters to the EU to green their production methods, failing which they will become less and less competitive on this market. Initially, this would apply to imports of iron, steel, aluminium, cement, fertilisers and electricity from countries where CO₂ emission standards are less stringent than in the EU.

The number of certificates required would depend, for each company, on the CO₂ emissions generated during production, according to the declarations of third country exporters. The risks of fraud or irregularities should be limited by clear calculation methodologies, control procedures and strong enforcement mechanisms. The price of carbon that may have already been paid in the third country could be deducted and countries that have linked their allowance market to the European market (Switzerland, EEA Member States) would be exempted.

The CBAM is scheduled to enter into force on 1 January 2023 with a transition period (from 2023 to the end of 2025) that will only involve a reporting obligation for importers, without any financial flows. From 2026, the CBAM will operate alongside the EU ETS.

While the Commission proposed allocating 75% of the revenues from the sale of carbon certificates to the EU budget,¹¹ the agreement of 15 March 2022 does not decide on the use of the revenues generated by the mechanism (almost EUR 2.1 billion per year from 2030).

A design to be made compatible with World Trade Organization (WTO) rules

The CBAM must ensure the economic efficiency of the combined EU ETS/CBAM system, environmental integrity, and be compatible with WTO rules. According to these rules, the CBAM must neither favour domestic production over imports nor discriminate between trading partners. It must pursue climate protection objectives (financing green projects), not economic objectives. The WTO has stated¹² that it is in favour of a unilateral mechanism such as the CBAM, provided it does not constitute unjustifiable trade discrimination or disguised protection. The EU agreement of 15 March goes in this direction, but some aspects of the mechanism remain to be defined.

- The CBAM is designed as a mirror system of the EU ETS. The mechanism can thus only gain momentum with the gradual disappearance of the free allowances distributed under the EU ETS in order to achieve price equality between production within and outside the EU. The way in which these allowances will be lifted is the subject of such disagreements between Member States and within the European Parliament that this aspect was not included in the political agreement of 15 March. However, the outcome of the debate determines the balance on which the rationale for the CBAM given to the WTO is based. Furthermore, during the transition period, as not all sectors of the EU ETS will be covered by the CBAM, there is a risk of unequal treatment, with some remaining under the free allocation regime and others falling within the scope of the CBAM, which is potentially questionable by the WTO.

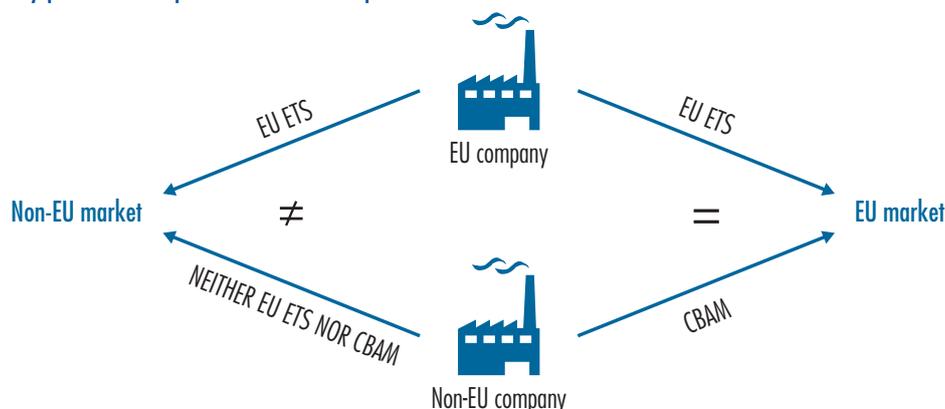
¹⁰ The CBAM is not a carbon tax, but an environmental measure. Decisions on the CBAM at EU level do not require unanimity, as would be the case in the tax field. A tax could be offset at the border for exporters, not the CBAM, which is a sensitive point of discussion.

¹¹ In order to contribute to the reimbursement of the NextGenerationEU (NGEU) recovery plan.

¹² WTO (J.-M. Paugam, September 2021): "WTO rules no barrier to ambitious environmental policies", speech.



D1 Exports potentially penalised compared to non-EU competitors



Source: Authors.

- The introduction of the CBAM is likely to have a negative impact on European exports in the absence of a compensatory mechanism to ensure a level playing field. Indeed, European producers under the EU ETS have to purchase allowances and thus become less competitive on the European and third country export markets, while foreign producers are not subject to the EU ETS (see Diagram 1 above). A possible export rebate would be considered as an export subsidy, which is not authorised under WTO rules.
- Finally, the discussions underway within the European decision-making institutions on the adoption of the CBAM and regarding the initiative of a global climate club (see below) will be crucial to ensure the mechanism's compatibility with WTO rules and its acceptance by third country partners, which were initially reticent about carbon pricing mechanisms (notably the United States and Japan).

Studies show that the CBAM would be very effective in reducing carbon leakage, but it could be even more effective if indirect emissions¹³ or more products and services, including downstream of the value chain, were included in the scope of the mechanism (Bellora and Fontagné, 2022). By the end of the transition period, the Commission will assess the functioning of the CBAM and determine whether these two points should be revised.

Finally, it is essential to address the social consequences of environmental policies to ensure their success. A reference on the inclusion of the social impact of the mechanism was thus added to the regulation of 15 March. The Commission considers that the impact of the CBAM on employment (the effects would be largely determined by the presence or absence of free allocations in the EU ETS¹⁴ market) and consumption¹⁵ would be low. The Social Climate Fund will cushion the impact on the most affected European economic agents. However, there is no mechanism for supporting the decarbonisation of production processes in non-EU countries.

3 European and international challenges

European challenges: combining efficiency and coherence

The main challenge faced by the carbon market concerns the system's capacity to set a carbon price rapidly, lastingly and according to a predictable trajectory, and that is sufficiently high to change investment behaviour (with a view to speeding up innovation and technological changes conducive to a less carbon-intensive production process) and consumption behaviour. In concrete terms, this is based on the calibration of the supply of allowances through the MSR, the management of the lifting of free allocations, the use of auction revenues (cushioning of social impacts, technology transfers) and the coherence

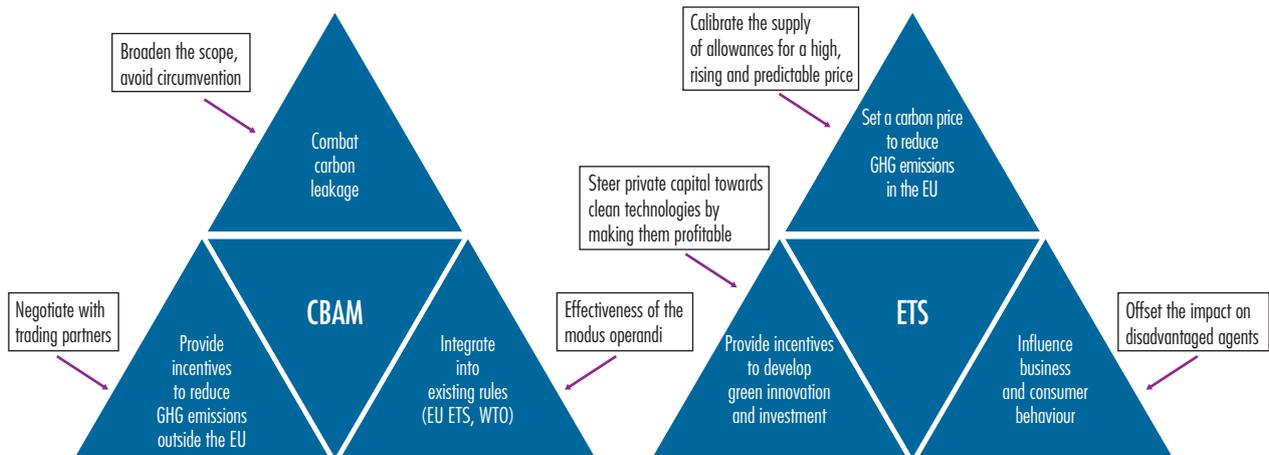
¹³ Carbon emissions from electricity used to produce goods, for example.

¹⁴ The total absence of free allocations without CBAM would lead to the greatest job losses.

¹⁵ The preferred option would have a small impact on GDP (-0.2%) and consumption (-0.6%), a positive impact on investment (+0.3%) in 2030, and a very limited negative impact on employment.



D2 Objectives and challenges of the EU ETS and the CBAM



Source: Authors.

Key: Objectives symbolised by triangles and issues symbolised by rectangles.

Note: CBAM, Carbon Border Adjustment Mechanism; EU ETS, European Union Emissions Trading System.

with the other instruments for combating global warming in Europe and third countries (see Diagram 2 above).

The system proposed by the Commission still has shortcomings: in the event of a recession or general crisis (as was the case with Covid-19), there is no mechanism to guarantee a minimum carbon price. In fact, the price fell sharply at the start of the Russian-Ukrainian conflict, before readjusting. Several institutions, including the IMF (2021), suggest introducing an international floor price, which could possibly differ from one area to another, in order to ensure price predictability and the incentivising nature of the system, as well as the fluidity of trade.

Moreover, while many carbon prices coexist, not only at the global level (see Chart 5 below), but also in Europe,¹⁶ there are no plans to rank them and make them converge. An independent carbon agency (which would be the start of a future European Central Bank for Carbon [Delpla and Gollier, 2019]) could both coordinate the different systems and ensure compliance with EU ETS market rules.

The need for strong international cooperation to ensure the effectiveness of the CBAM

At the international level, GHG emission reduction systems are heterogeneous, both in terms of ambition and instruments. International dialogue and cooperation on climate policies are needed to ensure that the global effort is shared as effectively as possible. Effective diplomacy seems to be necessary in particular for the implementation of the CBAM, which will have to fit in with the initiatives of other countries within and outside the EU. For example, the protocol signed between the EU and Switzerland¹⁷ or the negotiations underway with the United Kingdom¹⁸ meet this need for coordination.

The EU will therefore have to convince its trading partners of the value of establishing the CBAM. As long as a global carbon market has not been set up, discussions will have to take place in various forums (G7 or G20), which are likely to foster international cooperation between the countries involved, whether advanced or emerging.

16 Numerous explicit or implicit prices coexist such as the German allowance system, reference carbon prices, other allowance markets outside the EU and national carbon taxes (France, Sweden, etc.).

17 Protocol concluded in November 2017 and which came into force on 1 January 2020.

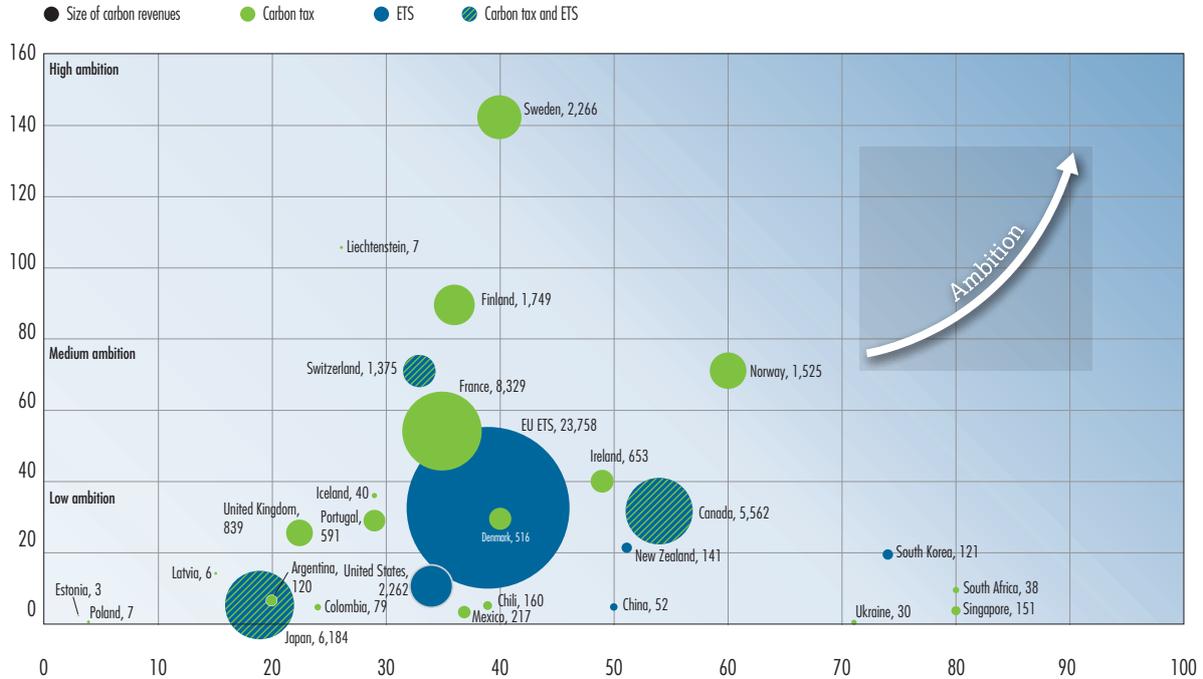
18 The United Kingdom set up its own allowance scheme on 1 January 2021 after Brexit. It shares the EU ETS target of zero net emissions by 2050. The EU-UK Trade and Cooperation Agreement signed in December 2020 provides for cooperation and then the possibility of linking the respective ETSs.



C5 World carbon prices in 2021

Ambition of the different carbon pricing schemes

(x-axis: emissions coverage in %; y-axis: prices in USD/tonne CO₂eq.)



Source: IACE, *Global Carbon Accounts in 2021*, October 2021.

Key: The size of the circles corresponds to the size of the revenues. The European market (EU ETS) covers 39% of member countries' emissions for an average price of USD 32.46/tCO₂eq in 2020. It generated USD 23,758 million in revenues in 2020. The ambition of a carbon pricing policy lies in two main factors: a broad coverage of emitting activities, and a high price.

Notes: In this chart, 'coverage' represents the emissions covered by the jurisdiction's existing system, and not all emissions covered by a carbon price. For example, in this chart, France taxes 35% of its emissions through its carbon tax (so-called "contribution énergie climat"). A share of the remaining emissions (approximately one-third) is subject to the EU ETS, with the remaining third exempt from any pricing (for more information, see *A first 360-degree climate assessment of France's State budget*, IACE, 2019).

EU ETS: European Union Emissions Trading System.

The potential knock-on effect of the CBAM comes up against the risk of trade tensions, especially as some exporting countries will be particularly affected by its implementation (see Chart 6) and have already criticised the project severely.

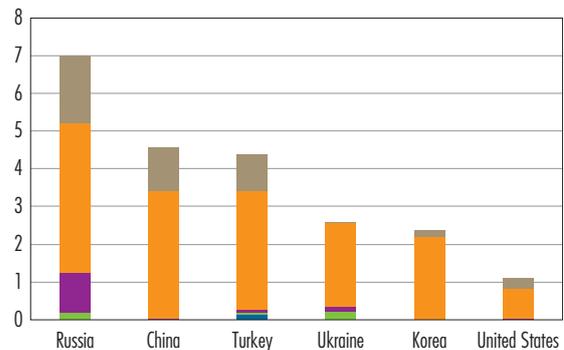
Despite the *general principle of common but differentiated responsibilities* in international law, which is included in the Paris Agreement, the CBAM makes no distinction between advanced, emerging and developing third country exporters (Sapir, 2021). In order to make the CBAM diplomatically acceptable, it could be useful to set differentiated trajectories, in keeping with the Paris Agreement, according to the characteristics of each country, particularly for the least developed.

C6 Main countries concerned by the Carbon Border Adjustment Mechanism (CBAM)

Imports by product in 2020

(EUR billions)

■ Cement ■ Fertilisers ■ Aluminium
■ Electricity ■ Iron and steel



Source: Eurostat.



While convergence of climate policies and carbon prices is essential, it will be difficult to achieve rapidly. The EU can play a leading role in achieving this. The climate club initiative,¹⁹ led by the German G7 presidency in 2022, aims to create an alliance of countries that have carbon pricing instruments or other comparable instruments. The objective is to promote ambitious climate policies, both in terms of regulation and taxation/subsidies, by involving a larger number of countries in global climate mitigation policies. Such a climate club, which would cover a larger number of sectors and a CBAM will need to be compatible and complementary. The statement accompanying the general approach on the regulation of 15 March 2022 suggests setting up such a club, in parallel with the CBAM, to strengthen international cooperation in the field of carbon pricing. However, the club membership criteria, the incentives for joining it, and its future governance are currently under discussion in order to make the system inclusive and to encourage a range of climate initiatives.

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The EU is at a crossroads in the fight against global warming: all the instruments likely to foster innovation at the European and global levels to achieve a more carbon-neutral economy as rapidly as possible need to be mobilised.

The major challenges therefore concern the EU's ability to send out a carbon price signal that is both binding and predictable, to support economic agents in changing their behaviour and to encourage the major world economies to integrate the environment into their economic policy choices. The structural transformations involved must be robust in the face of the political, social and geopolitical risks that are bound to arise between now and 2050. Finally, climate change is now identified as a source of financial risk that central banks, including the Banque de France, are integrating into their analyses and actions.²⁰ A relevant carbon price can serve the objective of greening finance, in particular by allowing for a better assessment of transition risks.

¹⁹ According to the idea of Nobel Prize winner William Nordhaus.

²⁰ During the One Planet summit in 2017, the Banque de France set up the Network for Greening the Financial System (NGFS). It regularly conducts macroeconomic and financial analyses on the impact of global warming on economies and assesses the resulting financial stability risks (Banque de France, 2022).



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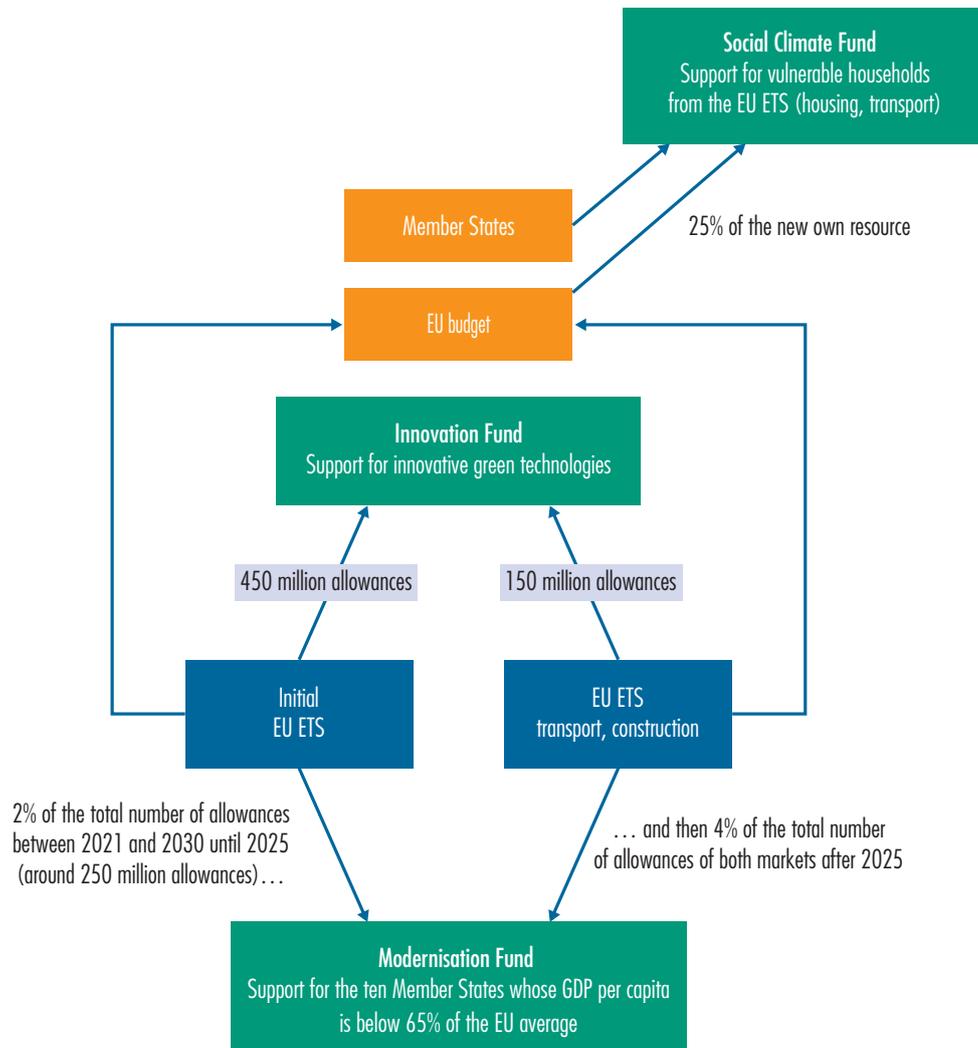
Appendix

Redirecting revenues from the auctioning of greenhouse gas emission allowances

The reform of the European Union Emissions Trading System (EU ETS) will change the way in which auctioning revenues are used over the period 2021-30: in addition to the allocations to the funds (see diagram below), 25% of the revenues from the remaining allowances will be added to the EU budget's own resources, in order to

finance the NextGenerationEU (NGEU) recovery plan and the social fund. The remainder will be paid out to Member States, which would have to use 100% of these sums for climate and energy projects, compared to 50% previously. This stronger conditionality guarantees that the funds will be used for the energy transition.

Use of revenues from the auctioning of greenhouse gas emission allowances



Source: Authors.

Note: EU ETS, EU Emissions Trading System.



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