

2.2 The EU Emission Trading System (EU ETS)

Giulio Galdi and Albert Ferrari

The EU Emission Trading System (ETS) is the cornerstone of Europe's climate policy and covers about 40% of the EU's greenhouse gas (GHG) emissions and about 5% of global emissions. The cap-and-trade scheme follows the 'polluters-pay-principle' that firms covered by the ETS must purchase an emission allowance for each tonne of CO₂-eq they inject into the atmosphere. In this respect, the EU ETS is a carbon pricing mechanism similar to a carbon tax. Two main features distinguish an ETS from a carbon tax. First, a carbon tax fixes the price for polluting but the amount of CO₂-eq abated by the measure is uncertain. By contrast, the EU ETS sets an emissions cap imposing an upper bound to emissions but the price of allowances is determined by buyers' bids (it currently hovers around €80).⁵⁴ Second, it incentivises firms to perform better and invest in decarbonising their activities. In fact, a firm that invests in decarbonising its activities will emit less and therefore need to buy a lower number of allowances. When installations receive some allowances for free based on sectoral benchmarks, or when they own too many allowances, they can even sell their surplus to more carbon-intensive firms.

The EU ETS has been in operation since 2005 and was the first international emissions trading scheme. It was the largest one until the Chinese ETS became operational in mid-2021. Indeed, many more ETSs currently exist and are being developed around the world in both developed and developing countries (Galdi et al., 2020; ICAP, 2022), enhancing ETS linkage possibilities.⁵⁵

A revision of the EU ETS is currently under discussion in the European Parliament and the Council following proposals made by the European Commission in the EU 'Fit for 55' Package released on 14 July 2021 (European Commission, 2021a, 2021b and 2021c; European Parliament Research Service, 2022). Originally, the Package aimed to align existing policies with the EU Climate Law (Regulation (EU) 2021/1119) objective of reducing GHG emissions by 55% compared with 1990 levels by 2030, and with the EU's commitment to reach net-zero carbon emissions by 2050. Modifications have been introduced after the first proposal. Following the REPowerEU initiative, the Commission presented an amendment to the EU ETS Directive which increases the Recovery and Resilience Facility financial envelope with €20 billion in grants from the sale of EU ETS allowances currently held in the Market Stability Reserve. Moreover, the final text adopted by the EU Parliament increases the target on GHG emission reduction to 63% by 2030. (European Parliament, 2022). Four trilogues have already taken place.

The overall cap in the EU ETS decreases at a yearly rate⁵⁶ (European Parliament and the Council, 2018). Between 2011 and 2020, the applicable rate, the so-called Linear Reduction Factor (LRF),⁵⁷ of 1.74% was applied as part of Phase III of the EU ETS. The currently applicable LRF has been raised to 2.2% above the 2010 baseline and was initially expected to be valid for Phase IV of the ETS (2021-2030).

Relative to its launch in 2005, in 2020 the sectors covered by the EU ETS achieved and exceeded the targeted 21% reduction in regulated emissions. Compared to 2005, in 2020 there was a 41% emission reduction in sectors covered by the EU ETS (European Environment Agency, 2021). This massive reduction

54 Daily figures on the EUA price are provided on the EMBER website, available at <https://ember-climate.org/data/carbon-price-viewer/>.

55 FSR Climate is currently investigating obstacles and pathways to ETS linkages in its Life DICET project, which is co-funded by the EU LIFE Programme. More information on the project is available at <https://lifedicetproject.eu/>.

56 See the EU ETS Handbook (European Commission, 2015) for more information on how the baseline year is set.

57 Detailed information is available at https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/emissions-cap-and-allowances_en.

can be partially attributed to the EU ETS itself. However, other policies and factors affected the emissions from the sectors covered. For instance, decarbonisation of the power sector was facilitated by support schemes for renewables (Edenhofer et al., 2021) and the COVID-19 pandemic led to an additional 12% emissions reduction in 2020 compared to 2019. Nevertheless, the EU ETS appears well on track to enforce a 43% reduction by 2030.

The Fit for 55 Package plans a reduction of 61% compared to 2005 by 2030 in emissions in the sectors covered by the EU ETS. This means that the LRF yearly rate should be further strengthened from the current 2.2% to 4.2% given the EU ambition to raise the overall GHG reduction target to 55%. In parallel, the total cap of allowances will be adjusted downward as if the new LRF was applied at the beginning of 2021 (re-basing for Phase IV).

It is worth underlining that all explicit and implicit climate policies can impact the demand for allowances so that if the overall climate policy framework is changed the EU ETS should be aligned accordingly.

Which gases and sectors are covered by the EU ETS?

The EU ETS covers carbon dioxide (CO₂), nitrous oxide (N₂O) and perfluorocarbon (PFC) emissions from about 10,000 heavy-energy-using installations. In terms of sectors, the scope currently covers power stations and industrial plants (oil refineries, steelworks and plants producing iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals). Moreover, air flights that both depart and land within the borders of the European Economic Area (the EU plus Norway, Lichtenstein and Iceland) have been covered by the EU ETS since 2012.

Both to limit administrative costs (monitoring, reporting and verification) and to avoid disproportionately burdening small firms, in most sectors only industrial installations above certain production capacity thresholds are subject to the EU ETS. A list of all the activities covered and the related thresholds is provided in Annex I of Directive 2003/87/EC (European Parliament and the Council, 2003).

With the Fit for 55 Package, emissions from the maritime transport sector will also be gradually included in the EU ETS from 2023 onwards. This will consist of all emissions from boats at berth in EU ports from intra-EU voyages and 50% of emissions from non-EU voyages.

In addition, the European Commission has proposed creating a separate second emission trading system (EU ETS 2) for fuel distribution for road transport and buildings starting in 2025. Although final users, including households and car drivers, are ultimately emitting GHG emissions, fuel distributors will be regulated under the EU ETS 2. Monitoring and reporting of emissions from the sectors would start in 2024 but the cap and surrendering of emission allowances would be set in 2026. Overall, the sectors covered by the EU ETS 2 would have to reduce their emissions by 43% in 2030 compared to 2005.

Already before July 2021 (i.e., before the energy crisis and increased tension with Russia), pricing the carbon emissions of these sectors raised many concerns among civil society and some Member States regarding the distributional impacts on households, micro-enterprises and transport users (Euractiv, 2022). To alleviate the effects on consumers, the European Commission has proposed a Social Climate Fund using 25% of the revenue from ETS 2 on road transport and buildings. Nevertheless, the creation of this second ETS is being questioned by some political groups and stakeholders. For instance, environmental and consumer groups claim that it may not bring about the necessary behavioural change to drive down emission reductions. They favour instead tightening the ambition level of fuel economy standards.

How are allowances allocated?

The EU ETS has undergone many substantial reforms since its implementation. One of the most relevant changes concerns allowance allocation, which in Phase I (2005-2007) and II (2008-2012) was decentralised and mainly relied on freely allocated allowances. Since Phase III (2013-2020) the total volume of emission allowances has been determined at the EU level, a single set of rules has governed their allocation, and auctioning has been the default allocation mechanism. In Phase III it is estimated that 43% of total allowances were freely allocated while the rest (57%) were auctioned by the Member States.

Free allowances are still allocated according to the risk of carbon leakage in each sector. Intuitively, the risk of carbon leakage is higher for firms whose ETS compliance represents a relatively large share of overall costs or whose exports and imports represent a relatively large share of turnover. Carbon leakage refers to the situation that may occur if, for reasons of costs related to climate policies, businesses were to transfer production to other countries with fewer emission constraints. This could lead to an increase in their total emissions. As for the power sector, generators have had to buy all their allowances since Phase III, with derogations for three lower-income Member States (Bulgaria, Hungary and Romania).

Installations in the industrial sector are given free allowances depending on their efficiency relative to 52 product-specific benchmarks outlined by the European Commission (2019a). In addition, one of three fall-back approaches is applied whenever products from an installation are too heterogeneous or change frequently. These benchmarks are based on: 1) process emissions; 2) heat consumption; or 3) fuel consumption (European Commission, 2019c). As a rule, the benchmark corresponds to the average performance of the 10% most efficient installations. Industrial installations belonging to a sector deemed at risk of carbon leakage receive free allowances covering 100% of their benchmarked emissions, which are computed by multiplying the relevant benchmark by the installation's recent output level. By contrast, only a share of this benchmark value is freely allocated to industrial installations that are not deemed at risk of carbon leakage. This share of allowances allocated freely to sectors deemed not at risk of carbon leakage has been constantly reduced, going from 80% in 2013 to 30% in 2020 with the objective of gradually phasing out free allowances from the system (European Parliament and the Council, 2018).

Furthermore, as there exists a maximum number of allowances that can be freely allocated at the EU level, a uniform cross-sectoral correction factor is applied to all installations so that the final allocation of free allowances does not fully cover all benchmarked emissions.

Finally, there are special allocation rules for the aviation sector, with 82% of allowances freely allocated, 15% auctioned and 3% withheld for new entrants and fast-growing companies.

During Phase IV, free allocation will focus on sectors at very high risk of carbon leakage, with updates of the carbon leakage list every 5 years and two updates of the benchmark values to avoid windfall profits and reflect technological progress. Highly exposed sectors will receive allowances equivalent to 100% of the relevant benchmark for free. Free allocation for less exposed sectors will amount to 30% up to 2026 and will be progressively phased out by 2030.

Does the EU ETS lead to carbon leakage?

So far, scientific evidence does not support the hypothesis that the EU ETS induces some carbon leakage, mainly due to very low to moderate allowance prices in the past (Verde et al., 2021b). Furthermore, sectors that are the most exposed to carbon leakage receive a higher share of free allowances, thus partly reducing their costs and the risk of carbon leakage. However, as the allowance price has significantly risen and

free allowance allocation will be curbed, the risk of carbon leakage could change accordingly.

Until Phase III (2013-2020), identification of sectors at risk of carbon leakage relied on two sectoral indicators computed at the EU level: carbon cost intensity (CCI) and trade intensity (TI). The former measured the carbon costs relative to gross value added whereas the latter measured the trade value relative to the size of the European market. To be classified as at risk of carbon leakage, firms needed to exceed 30% for either of the two, or 5% for CCI and 10% for TI.

As of Phase IV (2021-2030), a less lenient rule is applied to identify sectors at risk of carbon leakage. Specifically, a sector is classified as being at risk of carbon leakage if the product of the carbon emissions intensity indicator (CEI) (expressed in kgCO₂ per euro of gross value added) and the TI indicator, $CEI \times TI$, exceeds 20%. In addition, an adjustment to free allowance allocation is applied in cases of annual output variations exceeding +/-15%.

The first list of sectors at risk of carbon leakage – the ‘carbon leakage list’ – was defined in 2009 (European Commission, 2009) for the years 2013 and 2014. Of 258 sectors, 165 were classified as being at risk. A second list was defined in 2014 for the years 2015-2019 and later extended to cover 2020 (European Commission, 2014a). A third list was adopted in 2019 to cover all of Phase IV, with only 63 sectors still present (European Commission, 2019).

A central dimension in a European Green Deal-aligned ETS reform is free allocation of allowances. Especially if other complementary policies are introduced to mitigate the risk of carbon leakage, the number of free allowances allocated to sectors under the EU ETS would decrease in the second half of the decade 2020-2030. The Carbon Border Adjustment Mechanism proposal is especially relevant to this.

In the Fit for 55 Package, the European Commission proposed a gradual phasing out of free allocation in the sectors covered by the proposed Carbon Border Adjustment Mechanism.⁵⁸

Moreover, the benchmarks will be updated and made more stringent to better target free allowances. In addition, uptake of low carbon innovation technologies and implementation of the recommendation for energy audits will be further incentivised through free allocation.

Furthermore, the European Commission is planning to focus on the EU ETS as the main policy tool to decarbonise aviation by eliminating free allowances in this sector by 2027.

What is the role of offsets in the EU ETS?

At its inception, the EU ETS was designed to be part of a nascent international carbon market and thereby contribute to its development. The EU ETS was directly connected to the Kyoto system,⁵⁹ and owners of regulated installations were allowed to use Certified Emissions Reductions (CERs) and Emission Reduction Units (ERUs) respectively generated by the Clean Development Mechanism (CDM) and Joint Implementation (JI) to meet their compliance obligations. CERs and ERUs certify the abatement of one tonne of CO₂ in a sector or jurisdiction not covered by the EU ETS, thus granting firms purchasing them the right to emit an additional tonne of CO₂ in their EU ETS-covered activities.

However, as the European carbon market was troubled by large oversupply, restrictions on the use of international credits were put in place quite soon: quantitative restrictions were introduced in Phase II and

58 In December 2021 the FSR organised a debate on the prospects for the global carbon market. The recording is available at <https://fsr.eui.eu/the-global-carbon-market-after-cop26-is-the-glass-half-full-or-half-plainty/>.

59 Detailed information is available at <https://unfccc.int/process/the-kyoto-protocol/mechanisms>.

later tightened and complemented with qualitative restrictions in Phase III. As of Phase IV (2021-2030), the use of offsets is no longer allowed. Besides the need to curb oversupply to preserve the cost-efficiency of the EU ETS, the use of offsets has received much criticism from scholars and NGOs due to the low environmental integrity of most offset projects. According to a report commissioned by DG Clima (Cames et al., 2016), only 7% of the potential CER supply for the period 2013-2020 had a high likelihood of delivering real measurable additional emission abatement.

Although the EU does not currently intend to use international offsets for compliance under the EU ETS in Phase IV, the Paris Agreement opens a new chapter for global carbon markets to achieve national and European targets.⁶⁰ Parties to the Paris Agreement can use different instruments for trading emission reductions at the international level through mechanisms established in Article 6 of the Agreement. Article 6.2 allows countries to develop decentralised cooperative approaches under which they could trade mitigation units, so-called Internationally Transferable Mitigation Outcomes (ITMOs), to reach their own nationally determined contributions (NDCs). Article 6.4 opens the possibility of setting up a new centralised UN mechanism to trade emission reduction credits related to specific sustainable development projects. Article 6 also provides the opportunity to account for international cooperation and integration of non-market approaches. Following the deal reached on Article 6 at the COP26 in Glasgow in November 2021 (IISD, 2021), only time and actual implementation of the Paris rulebook will show how the EU intends to engage with the different mechanisms.

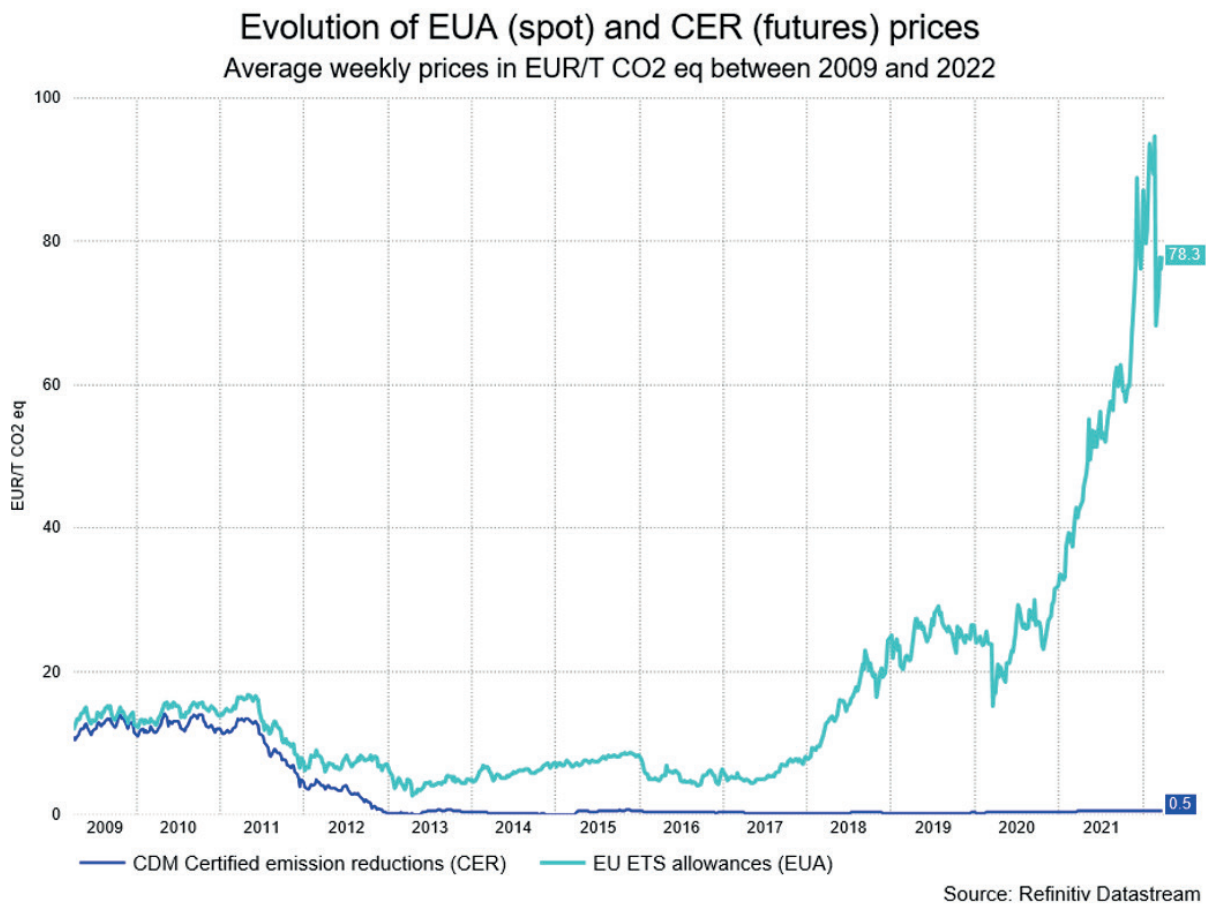
With the Fit for 55 Package the EU implements the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) for extra-European flights to and from countries outside the European Economic Area. When emissions from these flights reach a level above the 2019 level, they will have to be offset by credits from other sectors in countries that participate in the Paris Agreement, and from 2027 in CORSIA. Double accounting of emissions must be avoided and each credit should represent a tonne of CO₂ emissions that has been reduced or avoided.

What is the historical trend in allowance prices?

The EU allowance (EUA) price has undergone significant variations since its first phases. In 2006 the first publication of verified emissions revealed that the regulated installations had been overallocated, causing an abrupt fall in demand. In 2008 the Global Financial Crisis hit the EU ETS hard with the shrunken aggregate demand carrying over into the carbon market. Subsequently, the EUA price further declined and then stagnated for several years due to the combined effect of the oversupply of offsets and effective companion policies (Verde et al., 2021a). Indeed, national policies facilitating the deployment of renewables and an increase in energy efficiency reduced demand for allowances by polluting firms.

⁶⁰ Detailed information is available at https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/international-carbon-market_en.

Figure 14: Evolution of EUA and CER prices



Because of all these effects, by the start of Phase III (2013) the EU ETS had accumulated a surplus of about two billion allowances (which is more than the total volume of annual emissions under the EU ETS). As expected, this large surplus of allowances severely depressed the EUA price. In 2012 the European Commission started tackling the problem by postponing the auctioning of 900 million allowances from 2014-2015 to 2019-2020, a measure known as ‘backloading.’ However, as further action proved necessary the Market Stability Reserve (MSR) was made operational in January 2019 and the backloaded allowances were stashed in it as an initial reserve.

In 2020 and 2021 the EUA price increased sharply and steadily, almost reaching the symbolic value of 100 €/tonne in February 2022. The increase can be explained by many different factors, including the rise in gas prices pushing power producers to use more coal, the more stringent rules in Phase IV of the EU ETS including a higher LRF and the announcement of the EU Green Deal and the EU’s renewed ambition to cut its emissions (Euractiv, 2021). Some have argued that it can also be explained by disorderly trading or abusive behaviour, although these claims do not appear to be substantiated so far (ESMA, 2022). After the start of the war in Ukraine at the end of February 2022, the EU ETS has experienced a period of uncertainty and price instability.

How does the Market Stability Reserve control the volume of allowances available on the market?

The MSR is a rule-based mechanism that adjusts the number of allowances to be auctioned to the market surplus (i.e., the difference between the cumulative amount of allowances available for compliance at the end of a given year and the cumulative amount of allowances effectively used for compliance up to that given year). The surplus, known as the Total Number of Allowances in Circulation (TNAC), is published yearly and determines the response of the MSR:

- if the TNAC exceeds 833 million allowances, 12% (24% in the period 2019-2023) of the surplus allowances are withheld from auctions and added to the reserve;
- if the TNAC is less than 400 million, 100 million allowances are taken from the reserve and auctioned in the market;
- if the TNAC is between 400 and 833 million allowances, no response from the MSR is triggered.

The thresholds triggering adjustments to the supply of allowances delimit an interval of surplus values within which “experience shows that the market was able to operate in an orderly manner,” according to the European Commission (2014b).

From 2023 onwards, the number of allowances held in reserve will be capped at the volume auctioned in the previous year and allowances in excess will be cancelled, thus effectively reducing the total EU ETS cap. The European Commission reviews the MSR every five years, with the first review held in 2021.

The Fit for 55 Package contains a few minor amendments to the MSR. First, the European Commission proposes to extend the 24% rate of intake to be added to the reserve until 2030. Moreover, a smoother intake of allowances into the MSR would be enabled to avoid a threshold effect. In addition, after 2023 allowances above the volume auctioned in the previous year would be invalidated and the number of allowances in the MSR would be limited to 400 million. Third, the aviation and maritime sectors would be included in the calculation of the TNAC.

A separate chapter of the MSR should be created to control the volume of allowances in the EU ETS 2 for buildings and road transport. Moreover, excessive and sudden price increases in the ETS 2 can also trigger a release of new allowances from the MSR in the ETS. This mechanism is activated when for more than three consecutive months the average price of allowances in the auctions is more than twice the average price during the six preceding months.

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