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REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

on the functioning of the European carbon market in 2023

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1. Introduction

The European Union's Emissions Trading System (EU ETS) is a cornerstone of its climate policy, designed to bring down emissions cost-effectively. It puts a cap and a price on emissions from the energy, industry, maritime transport and aviation sectors in Europe, which account for approximately 40% of the EU's total emissions.

The cap ensures that emissions go down over time and the carbon price, determined by the market, provides an incentive for companies to reduce emissions where it costs least to do so. The carbon price also determines the revenue that the EU ETS generates for investment in climate action and energy transformation.

Since its launch in 2005, the EU ETS has helped drive down emissions from electricity and heat generation and industrial production by 47%[1], while generating over EUR 200 billion in auction revenue.

In 2023, emissions from these sectors have seen the highest annual decrease to date, of 16.5% compared to 2022, driven largely by the accelerated deployment of renewable energy sources in the power sector facilitated by a sustained robust carbon price signal.

The total revenue of nearly EUR 44 billion generated by the EU ETS in 2023 has gone primarily to Member States' budgets, but also to the Innovation and Modernisation Funds as well as to the Resilience and Recovery Facility's budget for the REPowerEU plan[2].

Further effort is needed, however, both to reduce emissions and to transform the EU's economy in line with European Climate Law targets[3] and European Green Deal objectives. On the way to climate neutrality by 2050, the EU has committed to reducing emissions by at least 55% by 2030 compared to 1990 levels. The EU ETS was revised in 2023 to this end, as part of the 'Fit for 55' package of reforms. The revision is now fully in force and the Commission and Member States have been working on its implementation.

This report takes stock of the functioning of the EU ETS in 2023 and the first half of 2024, including the implementation of the 2023 revision. It recaps the legislative work of the Commission, provides an updated overview of key elements of the system's framework and compiles annual developments such as emission and auction revenue trends.

[1] ETS emissions from installations in the power and industry sectors in 2023, without the UK, only the power sector in Northern Ireland, compared to an adjusted value of 2005 ETS emissions observing the same scope. Based on the European Environment Agency ETS data viewer, extracted on 20 August 2024.

[2] See Commission's website The Recovery and Resilience Facility and REPowerEU - Affordable, secure and sustainable energy for Europe for further information.

[3] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 (OJ L 243, 9.7.2021)

The report is adopted in line with Articles 10(5) and 21(2) of the ETS Directive (Directive 2003/87/EC)[4]. It is based mostly on data from the Union Registry, the EU Transaction Log (EUTL) and Member State reporting.

The report is accompanied by a staff working document (Technical information).

2. State of play on the EU ETS

2.1. Scope and coverage

The EU ETS applies in all 27 EU Member States plus Iceland, Liechtenstein and Norway, as well as to electricity generation plants in Northern Ireland[5]. Since January 2020, the EU ETS is also linked with Switzerland's emissions trading system (Swiss ETS).

Until 2023, the scope of the EU ETS extended to emissions from electricity and heat generation plants and manufacturing installations in Europe and from aircraft operators flying between airports in the European Economic Area (EEA) and from the EEA to Switzerland and to the UK.

As of 1 January 2024, the EU's fair share of CO_2 (carbon dioxide) emissions from maritime transport has also been included in the EU ETS (see Chapter 10). The EU ETS' extension to maritime transport covers all emissions occurring between two EEA ports and when ships are in EEA ports, and only half of emissions from voyages starting or ending outside the EEA.

From 1 January 2024, installations for the incineration of municipal waste must monitor and report their emissions under the EU ETS. They are not, however, required to surrender allowances for their emissions. In 2026, the Commission will assess the feasibility of extending the scope of the EU ETS to emissions from municipal waste incineration as well as emissions from other waste management processes, such as landfilling. In the meantime, emissions from waste treatment are subject to national reduction targets under the Effort Sharing Regulation (Regulation 2018/842)[6].

Information about installations and aircraft operators in the EU ETS (as it stood in 2023) can be found in Section I of the accompanying staff working document.

[4] Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Union and amending Council Directive 96/61/EC (OJ L 275, 25.10.2003)

[5] Under the Protocol on Ireland/Northern Ireland of the EU-UK Withdrawal Agreement.

[6] Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013 (OJ L 156, 19.6.2018)

2.2. ETS2 - the new emissions trading system for buildings, road transport and additional sectors

As part of the 2023 revision of the ETS Directive, a new and separate emissions trading system for emissions from fuel combustion in buildings, road transport and additional sectors (ETS2) was created. Although it will be a 'cap and trade' system like the existing EU ETS, ETS2 will cover emissions upstream. This means that fuel suppliers will be required to monitor and report the quantities of fuels that they release for consumption in the sectors that fall under the scope of ETS2, and to buy and surrender the allowances for the corresponding emissions. Entities falling under ETS2 are required to hold a greenhouse gas (GHG) emissions permit as from 1 January 2025 as well as an approved monitoring plan for the monitoring and reporting of their annual emissions. The obligation to surrender allowances will start in 2027 (or in 2028 in the event of exceptionally high gas or oil prices in 2026).

The monitoring and reporting requirements of ETS2 regulated entities have been set out in detail in the revised Monitoring and Reporting Regulation (Implementing Regulation 2018/2066)[7], adopted on 17 October 2023. The Commission also published a guidance document on the revised Regulation[8].

2.3. Social Climate Fund

The Social Climate Fund (SCF) was created alongside ETS2[9] to provide Member States with funding to support the most vulnerable groups in the green transition, such as households in energy or transport poverty[10]. The Fund will make EUR 65 billion available over 2026-2032, initially financed from the externally assigned revenue from the auctioning of ETS2 allowances as well as from the auctioning of 50 million allowances from the existing EU ETS. This budget will be distributed among Member States according to an allocation key. Member States will spend their SCF resources in line with their national social climate plans. Including the mandatory 25% contribution by Member States to their plans, the SCF should mobilise at least EUR 86.7 billion.

All Member States should submit their plans to the Commission by 30 June 2025. The plans should include an analysis of the likely effects of ETS2 on vulnerable groups. And to mitigate those effects, it should set out structural measures and investments in energy efficiency and renovation of buildings, in clean heating and cooling and integration of renewable energy, as well as in zero- and low-emission mobility solutions, including public transport. Member States

[7] Commission Implementing Regulation (EU) 2023/2122 of 17 October 2023 amending Implementing Regulation (EU) 2018/2066 as regards updating the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council (OJ L, 2023/2122, 18.10.2023). See consolidated version.

[8] See Commission's website ETS2: buildings, road transport and additional sectors for further information.

[9] Regulation (EU) 2023/955 of the European Parliament and of the Council of 10 May 2023 establishing a Social Climate Fund and amending Regulation (EU) 2021/1060 (OJ L 130, 16.5.2023)

[10] See Commission's website Social Climate Fund for further information.

will also have the option of spending part of their SCF budget on temporary direct income support.

The Commission and Member States are taking the appropriate steps to implement the SCF. To collaborate more efficiently, the Commission has set up an SCF formation under the expert group on climate change policy (CCEG-SCF). Through the CCEG-SCF, the Commission launched an exchange on good practices on the cost-effective measures and investments that could be financed by the Fund and on the public consultation of the plans. The Commission is also directly supporting 10 Member States in the preparation of their plans through the Technical Support Instrument[11].

In parallel, the Commission is working on a guidance on how to apply the 'do no significant harm' (DNSH) principle to the measures and investments financed by the SCF. In line with the DNSH principle, the SCF can only support measures and investments that do not significantly harm any of the environmental objectives within the meaning of Article 17 of the Taxonomy Regulation (Regulation 2020/852)[12]. These objectives are climate change mitigation and adaptation, sustainable use and protection of water and marine resources, circular economy, pollution prevention and control, and the protection and restoration of biodiversity and ecosystems.

The draft DNSH guidance was put forward for a 2-month public consultation, which ran from June 2024 to August 2024[13]. It will be adopted and published together with a general guidance document on the SCF and social climate plans (SCF guidance) by the new Commission. In the meantime, the Commission is following up on SCF-related questions from the Member States.

3. Cap on emissions

The cap in the EU ETS sets the maximum absolute volume of emissions that regulated entities can emit over a trading phase. It corresponds to the number of allowances issued for that period, where one allowance corresponds to one tonne of CO_2eq (carbon dioxide equivalent) emissions. The cap decreases annually to ensure that the EU meets its overarching emission reductions target. This also gives companies in the EU ETS certainty about the expected scarcity of supply of allowances.

Separate cap calculations apply to emissions from electricity and heat generation, industrial production and maritime transport and from aviation in the scope of the EU ETS. In 2023, 1 485 575 977 allowances were issued for electricity and heat generation and industrial

[11] The ten Member States include Belgium, Czechia, Denmark, Greece, Finland, Croatia, Lithuania, Latvia, Romania and Slovakia.

[12] Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 (OJ L 198, 22.6.2020)

[13] See Commission's website Consultation on the application of the "DNSH" principle under the Social Climate Fund for further information. The consultation closed on 23 August 2024.

production, while 26 341 779 allowances were issued for aviation. Maritime transport is included in the cap calculations from 2024 onward.

In 2021-2023, the cap decreased at a rate of 2.2% per year. For the cap calculation for installations in the electricity and heat generation and industrial manufacturing sectors, this was equivalent to 43 003 515 allowances per year. Table 1 shows the total quantities of allowances issued for the different sectors under the EU ETS cap.

Table 1. EU ETS cap (2021-2024). Separate cap calculations apply to (i) emissions from electricity and heat generation, industrial production and from 2024 onwards maritime transport, and (ii) emissions from aviation in the scope of the EU ETS.

Year	Total quantity of allowances for electricity and heat generation, industrial production and maritime transport	Total quantity of allowances for aviation
2021	1 571 583 007	28 306 545
2022	1 528 579 492	27 268 379
2023	1 485 575 977	26 341 779
2024	1 386 051 745	27 563 529[14]

With the 2023 revision of the ETS Directive, the overall cap has been set to bring down emissions by 62% by 2030, compared to 2005. The first cap adjustments to this end took effect in 2024 and are reflected in the decision (Commission Decision 2023/1575)[15] adopted on 27 July 2023.

The cap for 2024 has been reduced by 90 million allowances and the reduction rate has been increased to 4.3% per year for the period 2024-2027, equivalent to 87 924 231 allowances per year. These adjustments already recognise that emissions from maritime transport have been included in the EU ETS from 2024. The 2024 cap has been calculated at 1 386 051 745 allowances.

Figure 1 illustrates changes in the cap throughout all EU ETS phases, including the forthcoming adjustments.

[14] From 1 January 2024, the scope of the EU ETS for aviation also extends to emissions from most flights between the EEA and EU's nine outermost regions as well as departing flights from the outermost regions to Switzerland and the UK (see Chapter 9). The total quantity of allowances for aviation reflects the extended scope of the EU ETS for aviation.

[15] Commission Decision (EU) 2023/1575 of 27 July 2023 on the Union-wide quantity of allowances to be issued under the EU Emissions Trading System for 2024 (OJ L 192, 31.7.2023)

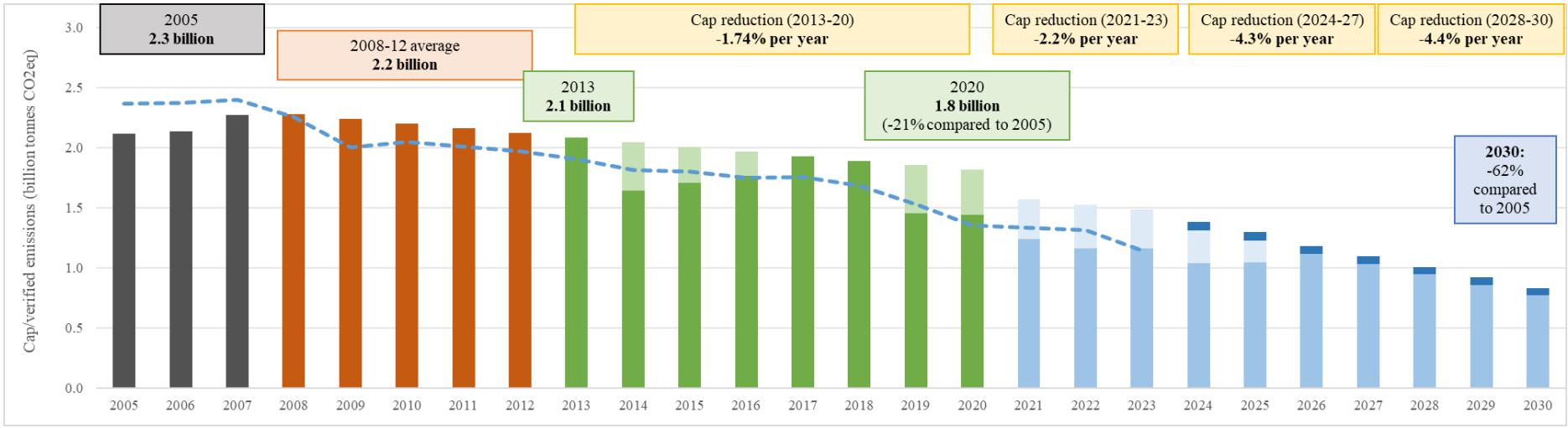


Figure 1. Emissions cap in the EU ETS compared with verified emissions. The figure considers the 2023 revision of the ETS Directive, i.e. rebasing of the cap in 2024 and 2026, including the maritime transport sector in the EU ETS from 2024 and the linear reduction factor of 4.3% in 2024-2027 and 4.4% from 2028. Aviation is not included. Due to changes in scope, the 2005-2007 figures are not directly comparable with the latest ones. From 2021, the EU ETS no longer covers installations in the UK, only electricity generators in Northern Ireland. Legend: bars (cap), light shaded bars in 2014-2016 (allowances backloaded from auctions), light shaded bars from 2019 (feeds of allowances to the Market Stability Reserve), dark shaded bars from 2024 (maritime scope extension), dashed line (verified emissions).

4. Auctioning of allowances

Auctioning is the main method of distributing allowances in the EU ETS, accounting for up to 57% of the cap[16]. The Auctioning Regulation (Regulation 1031/2010)[17] sets rules to ensure that auctions take place in an open, transparent, harmonised and non-discriminatory way. It specifies the timing, administration and other aspects of auctioning emission allowances.

In 2023, auctions continued to take place through the European Energy Exchange AG (EEX):

- as the common auction platform for the 25 Member States participating in a joint procurement procedure;
- for Poland, which opted out of the joint procurement procedure but has not appointed its own auction platform;
- for Iceland, Liechtenstein, and Norway, after the EEA Agreement was amended in 2019 to allow them to participate in the Joint Procurement Agreement for the common auction platform;
- for the UK to auction allowances for electricity generation plants in Northern Ireland.

The EEX also auctioned allowances for Germany as their 'opt-out' auction platform.

Table 2 provides an overview of the annual volumes of allowances auctioned by the EEX since 2021.

Table 2. Total volumes of allowances auctioned (from 1 January 2021 to 30 June 2024)

Year	General allowances	Aviation allowances
2021	582 952 500	3 785 500
2022	482 389 000	3 698 000
2023	517 587 000	5 720 500
2024 (until 30 June)	281 107 000	2 718 000

In total, 223 auctions were held in 2023 and 106 auctions were held in the first half of 2024. No auctions were cancelled.

[16] In practice, the exact share varies as the volume of allowances auctioned has been reduced to contribute to the Market Stability Reserve, while the volume of allowances earmarked for free allocation has not changed.

[17] Commission Regulation (EU) No 1031/2010 of 12 November 2010 on the timing, administration and other aspects of auctioning of greenhouse gas emission allowances pursuant to Directive 2003/87/EC of the European Parliament and of the Council establishing a scheme for greenhouse gas emission allowances trading within the Community (OJ L 302, 18.11.2010)

As of July 2023, auction volumes include allowances allocated to the Recovery and Resilience Facility (RRF) under the REPowerEU Regulation (Regulation 2023/435)[18]. Allowances auctioned under the REPowerEU Regulation will raise EUR 20 billion for the Facility by 31 August 2026[19]. Member States will use these additional RRF resources to carry out further reforms and make investments to advance the clean energy transformation and boost energy security. In 2023 and the first half of 2024, over EUR 5.5 billion was raised for the RRF - REPowerEU (with 35 325 000 allowances auctioned in 2023 and 42 124 500 allowances auctioned in the first half of 2024).

Figure 2 gives an overview of auction clearing prices in the EU carbon market in 2023 and the first half of 2024. The highest auction price in 2023 of EUR 96.33 was reached on 28 February. The lowest price of EUR 66.49 was recorded at the last auction of the year, on 18 December, reflecting the general downward trend in the second half of the year. The average price in 2023 was EUR 83.60, up from EUR 80.18 in 2022. In the first half of 2024, the price varied between EUR 49.50 (23 February) and EUR 75.35 (3 June).

The auction platform regularly publishes detailed results of each auction on its website[20]. Further information on the performance of auctions, including the participation, cover ratios and prices, can be found in the ETS countries' auction reports[21].

Figure 2. Clearing prices in auctions of general allowances (from 1 January 2023 to 30 June 2024) [EUR/tonne CO_2]



[18] Regulation (EU) 2023/435 of the European Parliament and of the Council of 27 February 2023 (OJ L 63, 28.2.2023)

[19] Regulatory update, Revised 2023 auction calendar published, DG Climate Action, 23.7.2023

[20] EEX, EU ETS Auctions

[21] Auction reports, DG Climate Action, 30.6.2024

5. Free allocation of allowances

While auctioning is the primary method for distributing allowances in the EU ETS, a significant volume of allowances is allocated to installations for free to address the risk of carbon leakage[22]. Free allocation, however, is a transitional measure primarily addressed to industry sectors.

A dedicated carbon leakage list identifies sectors at risk of carbon leakage, eligible to receive free allocation. The list for 2021-2030 identifies 63 sectors and sub-sectors covering about 94% of industrial emissions in the EU ETS[23].

Free allocation to specific sectors is based on performance benchmarks, which reflect an average emissions intensity per unit of product of the 10% most efficient installations in each sector. For emissions beyond those benchmark values, allowances have to be bought on the market. Benchmarks are also reduced incrementally to strengthen the incentive for the sector to decarbonise and advance innovation.

In 2021, the Commission updated the benchmark values for the first allocation period, 2021-2025[24]. The benchmarks will be updated for the second allocation period (2026-2030). According to the revised ETS Directive, the annual reduction rates will then be increased to stimulate further industrial transformation. The minimum rate will increase from 0.2% to 0.3% per year and the maximum rate from 1.6% to 2.5% per year. The applicable annual reduction rate will be determined specifically for each benchmark.

Since 2021, volumes of free allocation are being adjusted when changes in industrial production occur[25]. The threshold for adjustments is set at 15% increasing or decreasing production. Operators are required to submit yearly reports on production data to national competent authorities, based on which adjustments may be made to the volumes of free allocation issued. This added stringency has led to an increase in the number of yearly adjustments to the free allocation. The average number of applications per year submitted in 2021-2023 was over 3 800, around three times more than the yearly average up to 2020.

Initially, the total free allocation for 2021-2025 had been calculated at 2 791 million allowances, for 7 430 installations. Assuming a carbon price of EUR 75/tCO_2, the value of this allocation would amount to about EUR 42 billion every year during this period. By mid-2024,

[22] Carbon leakage could occur if ETS-regulated activities were moved to non-EU countries with less ambitious climate policies, leading to an increase in overall greenhouse gas emissions.

[23] Commission Delegated Decision (EU) 2019/708 of 15 February 2019 supplementing Directive 2003/87/EC of the European Parliament and of the Council concerning the determination of sectors and subsectors deemed at risk of carbon leakage for the period 2021 to 2030 (OJ L 120, 8.5.2019)

[24] Commission Implementing Regulation (EU) 2021/447 of 12 March 2021 determining revised benchmark values for free allocation of emission allowances for the period from 2021 to 2025 pursuant to Article 10a(2) of Directive 2003/87/EC of the European Parliament and of the Council (OJ L 87, 15.3.2021)

[25] Commission Implementing Regulation (EU) 2019/1842 of 31 October 2019 laying down rules for the application of Directive 2003/87/EC of the European Parliament and of the Council as regards further arrangements for the adjustments to free allocation of emission allowances due to activity level changes (OJ L 282, 4.11.2019)

the Commission adopted 12 decisions to adjust free allocation volumes due to changes in industrial production volumes, resulting in a reduction by 116.8 million allowances[26]. In parallel, however, the Commission adopted five decisions correcting the initial level of free allocation, adding 4.6 million allowances[27]. This was necessary due to errors found in the data submitted by installations. Overall, the free allocation for 2021-2025 has been reduced by 112.2 million allowances thus far compared to the initial total free allocation.

Adjustments to the level of free allocation are made from the New Entrants' Reserve (NER). These adjustments also include changes in allocation due to installations opening or closing. The initial volume of the NER at the start of 2021 amounted to 331.3 million allowances. This included unallocated allowances and 200 million allowances from the Market Stability Reserve.

Table 3 summarises the annual levels of free allocation in the first allocation period – both initial and adjusted levels.

Table 3. Free allocation under the EU ETS (2021-2025) [million allowances]. Data extracted from the EU Registry on 30 June 2024.

Year	2021	2022	2023	2024	2025	Total
Initial free allocation (EU-27 + Iceland, Liechtenstein and Norway)	559.6	558.9	558.2	557.5	556.8	2 791.1
Actual free allocation	545.9	542.5	537.3	527.0	526.2	2 678.9
Adjusted and corrected free allocation	-13.7	-16.4	-20.9	-30.5	-30.6	-112.2

The revision of the ETS Directive aligns the rules on free allocation with the strengthened EU ETS. The scope of the activities regulated by the system and benchmarks has been broadened to encourage the deployment of new technologies such as green hydrogen or hydrogen-based steel. In parallel, conditionality requirements have been introduced to access free allocation. These take the form of energy audits and for certain installations, climate neutrality plans.

To implement the 2023 revision of the ETS Directive, a revision of the Free Allocation Regulation (Delegated Regulation 2019/331) was adopted in January 2024[28]. The revision introduces additional improvements based on the experienced gained over the first years of the current allocation period. The main changes include the introduction of the free allocation

[26] The European Free Trade Agreement Surveillance Authority also adopted Decisions for Iceland, Liechtenstein, and Norway.

[27] The European Free Trade Agreement Surveillance Authority also adopted Decisions for Iceland, Liechtenstein, and Norway.

[28] Commission Delegated Regulation (EU) 2024/873 of 30 January 2024 amending Delegated Regulation (EU) 2019/331 as regards transitional Union-wide rules for harmonised free allocation of emission allowances, (OJ L, 2024/873, 4.4.2024). See consolidated text.

conditionality and the gradual phase-out of free allocation for some products corresponding to the phase-in of the Carbon Border Adjustment Mechanism (CBAM). In addition, to further incentivise emission reductions and to ensure a level playing field between conventional and new technologies, some product benchmark definitions have been modified, notably those related to hydrogen and steel production. Adjustments have also been made to other aspects of the Free Allocation Regulation to incentivise the electrification of industrial processes.

5.1. Carbon Border Adjustment Mechanism

As part of the Fit for 55 package, the Carbon Border Adjustment Mechanism (CBAM) Regulation (Regulation 2023/956)[29] was adopted to mitigate the risk of carbon leakage while the EU strengthens its climate action.

In certain EU ETS-covered industry sectors (cement, aluminium, fertilisers, hydrogen, iron and steel), the CBAM will gradually replace free allocation from 2026 onwards. These sectors represent approx. 54% of total free allocation in 2021-2025. As of 2026, importers of goods in CBAM sectors to the EU will need to buy and surrender certificates for the embedded emissions. To support industry in their decarbonisation efforts, the ETS Directive directs proceeds from the auctioning of phased-out free allowances to the Innovation Fund (see Chapter 8.2), giving special attention to projects in CBAM sectors.

By ensuring that an equivalent price is paid for the embedded carbon emissions generated in the production of certain goods imported into the EU, the CBAM will ensure the carbon price of imports is equivalent to the carbon price of domestic production (under the EU ETS), and that the EU's climate objectives are not undermined. The CBAM will cover direct emissions for all covered sectors and indirect emissions (from electricity consumed during production processes) for cement and fertilisers. Indirect emissions will not initially be considered for the sectors eligible for the indirect carbon cost aid (i.e. aluminium, hydrogen, iron and steel – see Chapter 8.1).

A transitional period, during which importers report emissions but are not yet required to make payments, began in October 2023 and will run until the end of 2025, before the new regime is gradually phased in.

5.2. Carbon leakage risk for goods produced by CBAM sectors in the EU for export

Goods produced in the EU in CBAM sectors for export might face a competitive disadvantage on third-country markets, if they compete with goods that are not subject to equivalent carbon pricing. Under Article 10a(1a) of the ETS Directive, as part of its annual report on the functioning of the European carbon market (this report), the Commission is required to assess the carbon leakage risk for goods produced by CBAM sectors in the EU and exported to third countries that do not apply the EU ETS or a similar carbon pricing mechanism.

[29] Regulation (EU) 2023/956 of the European Parliament and of the Council of 10 May 2023 establishing a carbon border adjustment mechanism (OJ L 130, 16.5.2023)

The Commission launched its assessment in Q3-2024[30], and this report includes the initial findings. The choice of metric and methodology will be further refined for future assessments to monitor the potential risk of carbon leakage in a way that can be updated over time[31]. The initial findings cannot be considered definitive since CBAM is still in its transitional phase. However, the Commission will continue to assess the carbon leakage for exports during the gradual phase-in of CBAM (and phase-out of free allocation) as required by the ETS Directive and the CBAM Regulation.

Once the analytical work is completed, the updated results will be published, based on a broader range of indicators, qualitative analyses and feedback from stakeholders. Additional assessments will cover the role and accelerated uptake of hydrogen as well as developments related to trade flows and the embedded emissions of goods produced by CBAM sectors on the global market. The Commission will continue to assess the issue of carbon leakage risk for exports as CBAM enters its definitive phase, and report on it before January 2028 as required by Article 30(6) of the CBAM Regulation.

The initial assessment focused on the comparison of the emission intensity in the EU (expressed in kg CO_2eq per EUR of their production value)[32] and export intensity (export value divided by the sum of production value and import value)[33]. Figure 3 compares the two indicators at 8-digit (CN) level[34]. The higher the export intensity and the emission intensity of a CBAM good, the more sensitive exports of that good are to increased carbon prices and the more vulnerable it may be to a potential carbon leakage risk in case of relevant effective carbon price differences with third countries.

The size of the bubbles in Figure 3 represents the combined value of multiplying the export intensity with the emission intensity for each of the CBAM goods. This combined indicator value at the 8-digit level may provide an overall indication of the sensitivity of exports to carbon pricing. It is, however, not directly comparable to the carbon leakage indicator (CLI)

[30] Contract reference CLIMA/A4/FWC/2023/0002/RICARDO

[31] This assessment will not change the outcome of the assessment to determine the 2021-2030 carbon leakage list at the 4-digit NACE code level.

[32] Emission intensity values were taken from Joint Research Centre (2023) Greenhouse gas emission intensities of the steel, fertilisers, aluminium and cement industries in the EU and its main trading partners and Estimation of the global average GHG emission intensity of hydrogen production. These values for CBAM goods for both direct and indirect emissions were then multiplied by the 2019 data from PRODCOM on the production volume sold and divided by the 2019 data from PRODCOM on the production value sold. The GHG intensity value for hydrogen was calculated based on 2021 data. The author confirmed that the value was not expected to change significantly so it was assumed in the assessment that the same value would apply for 2019.

[33] For production, import and export values 2022 data from PRODCOM was used.

[34] Further information will be necessary, for example, on trade patterns with third countries and the CO_2 pricing applied abroad, before more definitive conclusions can be reached on the carbon leakage risk status of the goods covered by the CBAM.

used to determine the 2021-2030 carbon leakage list, which is more aggregated (4-digit level) and not focused specifically on exports[35]. Initial insights from the preliminary results include:

- No product falls into the quadrant of being both emission – and export-intensive. Products that are very emission-intensive are little traded. And all products with high export intensity have a relatively low emission intensity.

- The emission intensity of hydrogen (grey circle) is relatively high, but the export intensity of hydrogen is very low resulting in a low combined indicator value of 0.013. However, with the uptake of hydrogen produced with renewable energies these trends could reverse depending on how the market for renewable hydrogen develops.

- Goods from the cement sector (orange circles) are less frequently traded. The cement clinker - an emission-intense input product, however, is shipped more easily than cement. This warrants further investigation as it currently has a high combined indicator value of 2.109.

- Many fertilisers (yellow circles), aluminium (green circles) and steel goods (blue circles) have lower emission intensity values than hydrogen and cement goods but are much more frequently exported and therefore, this results in relatively high combined indicator values.

The combined indicator values for a selection of CBAM products from each of the industrial sectors covered are provided for illustrative purposes only. No threshold value has been set to limit the scope of CBAM goods to be both quantitatively and qualitatively assessed for potential carbon leakage risk.

[35] The combined indicator values at the 8-digit level are lower than the CLI values calculated at the 4-digit level as the trade intensity only relates to exports and gross value added (GVA) data is replaced by production value (which is lower in comparison) and therefore the threshold value of 0.2 that was applied in the 2021-2030 carbon leakage list to determine sectors or sub-sectors at risk of carbon leakage cannot be directly applied to the combined indicator values calculated for CBAM goods at the 8-digit level.

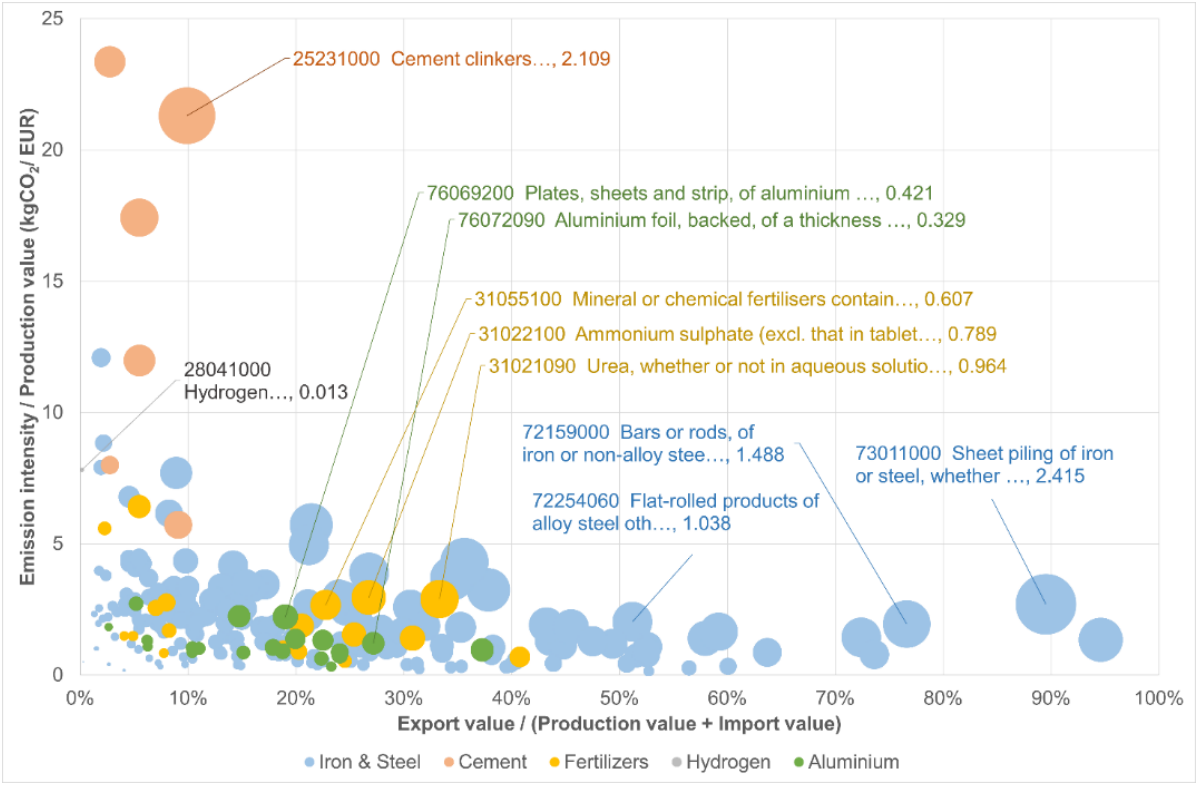


Figure 3. Comparison of the export intensity and the emission intensity values of CBAM goods

6. EU carbon market

6.1. Balancing supply and demand

The Market Stability Reserve (MSR) is a rule-based, long-term solution to a structural imbalance between the supply of and demand for allowances in the EU carbon market at the start of phase 3. In 2013, the market had a surplus of 2.1 billion allowances, which the MSR has since helped reduce. The Reserve also improves market balance in the short-term, therefore making it more resilient to sudden supply-demand shocks, for example due to the economic downturn caused by the COVID-19 pandemic in 2020.

The MSR adjusts the supply of allowances to the EU carbon market according to pre-set thresholds of the total number of allowances in circulation (TNAC). Based on the level of the TNAC, allowances are either withdrawn from auctions and placed in the Reserve or released from the Reserve and auctioned. This way, the MSR fosters balance and resilience to supply-demand shocks, allowing the EU carbon market to function smoothly. The Reserve began operating in 2019 and has since withdrawn allowances from circulation every year.

The Commission publishes the TNAC each year. It is calculated for the preceding year, while supply adjustments are made over the 12 months following its publication and according to a specific key. On 1 June 2024, the Commission published the Communication on the TNAC

for 2023[36]. It reflects changes made to strengthen the Reserve as part of Fit for 55 package – in the revision of both the ETS Directive and the MSR Decision.

The 2023 TNAC totalled 1.11 billion allowances – a decrease compared to 2022, but still above the threshold activating the Reserve. As a result, 267 million allowances (24% of the TNAC) are being withdrawn from auctions between September 2024 and August 2025. As of 2023, the MSR invalidates allowances in its holdings above a certain threshold. As from 2024, the applicable threshold has been set at 400 million allowances. On 1 January 2024, the MSR invalidated 382 million allowances, leaving 400 million in the Reserve. Since 2023, the MSR has invalidated a total of 2.9 billion allowances.

Figure 4 illustrates the trend in the surplus of allowances in the EU carbon market since 2013. National contributions to the MSR are presented in Table B in Section II of the accompanying staff working document.

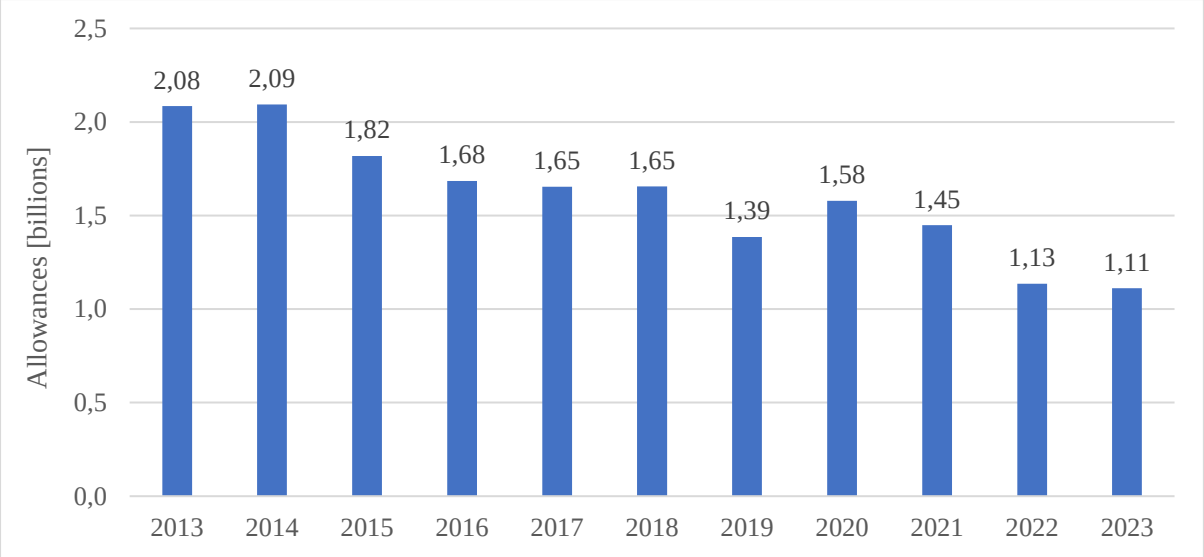


Figure 4. Surplus of allowances in the EU ETS (2013-2023)

6.2. Voluntary cancellation

Article 12(4) of the ETS Directive relates to Member States cancelling allowances, in the event of closure of electricity generation capacity in their territory due to additional national measures. In such a case, the Member State concerned must inform the Commission of an intended cancellation. The cancellation is carried out by reducing the total quantity of allowances to be auctioned by the Member State concerned and the quantity is limited to a maximum of the sum of verified emissions of the installation(s) being closed, over a period of 5 years preceding the closure. The procedure for this cancellation of allowances is laid down in Article 25 of the Auctioning Regulation.

[36] Communication from the Commission - Publication of the total number of allowances in circulation in 2023 for the purposes of the Market Stability Reserve under the EU Emissions Trading System established by Directive 2003/87/EC, (OJ C, C/2024/3415, 3.6.2024)

In December 2023, Germany notified its intention to voluntarily cancel allowances associated with the closure of two power plants in 2022 as part of the country's coal phase out policy. The notified number of allowances to be cancelled is yet to be determined. The Commission has published the notification on its website[37].

The cancellations are planned to occur between 2025 and 2030. The exact number of allowances to be cancelled in relation to the notification may be communicated to the Commission annually. The deadline for the first notification is 31 May 2025. The methodology to calculate the overall number of allowances to be cancelled is part of the notification and takes into account the emissions of the replacing electricity generation in the electricity market as well as the operation of the Market Stability Reserve.

6.3. Market oversight

The EU carbon market is subject to robust market oversight rules enshrined in EU financial markets. It consists of a primary market, where emission allowances are auctioned to market participants and a secondary market where spot and derivative contracts of emissions allowances are traded among market participants. Both spot and derivatives in emissions allowances are classified as financial instruments under MIFID II – Directive on markets in financial instruments (Directive 2014/65/EU)[38]. This classification is also reflected in secondary legislation, including the Auctioning Regulation, which oversees the primary market (auctions of allowances).

Supervision of the EU carbon market is shared between the financial authorities of all Member States[39], under the coordination of the European regulator, the European Securities and Markets Authority (ESMA). ESMA monitor markets participants' behaviour through extensive reporting and transparency requirements. In addition, the Regulation on market abuse (Regulation 596/2014)[40] obliges market participants to immediately report suspicious orders and transactions. National authorities in turn have the power to respond with remedial action or penalties if they identify market abuse.

In the 2023 revision of the ETS Directive, several amendments were agreed to further improve the transparency of the EU carbon market. ESMA has been requested to conduct a periodic assessment of the functioning of the market. On 31 August 2023, ESMA published the 'Report on trends, risks and vulnerabilities of 2023', concluding that the EU carbon market had remained stable in 2023 and had continued to operate in line with market fundamentals.

[37] Notification by Germany of voluntary cancellation for plants closed in 2022, DG Climate Action, 2.05.2024

[38] Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments (OJ L 173, 12.6.2014). See consolidated version.

[39] See the list of national competent authorities responsible under the Regulation on market abuse on ESMA's website.

[40] Regulation (EU) No 596/2014 of the European Parliament and of the Council of 16 April 2014 on market abuse (OJ L 173, 12.6.2014). See consolidated version.

On 7 October 2024, ESMA published an updated report on the monitoring of the EU carbon market[41]. The report includes the most recent analysis of the carbon market, based on 2023 data. The report does not unveil any significant issue in the functioning of the market. It points to the decarbonisation of the power sector and to industrial activity as important market fundamentals for the evolution of the market.

ESMA also outlined the relative concentration of auctions, which is due to the operators' preference to source allowances via financial intermediaries. ESMA explained that trading in secondary markets is mainly undertaken through derivatives, following the annual EU ETS compliance cycle, where non-financial sector firms hold long positions (for compliance purposes), while banks and investment firms hold short positions. The report underlines that most recommendations from ESMA's 2022 report, which were aimed to enhance the transparency of the carbon market, have been implemented.

ESMA also stressed the importance of having Legal Entity Identifiers (LEIs) available for entities in the Union Registry and calls for additional effort by national administrators to ensure a timely implementation of the LEI registration requirement. This is particularly relevant in 2024, as the number of account holders will increase due to the expansion of the EU ETS. ESMA considers that further analysis and monitoring of the carbon market is warranted in this respect.

While it is not mandatory to have an LEI to open an account in the Union Registry, entities that have an LEI are required to report this information in the Union Registry when opening an account. In addition, the 2023 amendment of the Registry Regulation (Regulation 2019/1122)[42] requires that national administrators review, by the end of 2024, the accounts that do not contain information on the LEI or status of trading venue or central counterparty referred to in Table III-I of Annex III to the Regulation.

On 28 March 2024, the revised MIFID II[43], MIFIR – Regulation on markets in financial instruments (Regulation 2024/791)[44] entered into force, further strengthening the rules on financial markets, transparency and oversight. Article 57 of MIFIR extends position management controls to trading venues, which trade derivatives on emission allowances. Article 58 of MIFIR amends the scope of position reporting of trading venues and investment firms by excluding emission allowances and introduces a new obligation to submit position

[41] ESMA Market Report on EU Carbon Markets - 2024 (ESMA50-43599798-10379, 7.10.2024)

[42] Commission Delegated Regulation (EU) 2019/1122 of 12 March 2019 supplementing Directive 2003/87/EC of the European Parliament and of the Council as regards the functioning of the Union Registry (OJ L 177, 2.7.2019). See consolidated version.

[43] Directive (EU) 2024/790 of the European Parliament and of the Council of 28 February 2024 amending Directive 2014/65/EU on markets in financial instruments (OJ L, 2024/790, 8.3.2024). See consolidated version.

[44] Regulation (EU) 2024/791 of the European Parliament and of the Council of 28 February 2024 amending Regulation (EU) No 600/2014 of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments (OJ L, 2024/791, 8.3.2024). See consolidated version.

reports twice weekly[45], enhancing the transparency for trading in emission allowances and derivatives thereof.

The new rules also require the Commission to conduct, by 31 July 2025, a comprehensive assessment of the appropriateness of the overall rule framework for markets of commodity derivatives, which includes emission allowances and associated derivative products. This assessment will consider whether the regimes for the position limits and the position management controls help prevent market abuse and foster orderly pricing and settlement conditions. The Commission will also assess the criteria for establishing when an activity is to be considered ancillary to the main business at group level, considering the liquidity and the orderly functioning of commodity derivatives markets including the trading of emission allowances and derivatives thereof. Furthermore, the Commission should assess to what extent transaction data in markets for commodity derivatives or for derivatives of emission allowances could be collected in a single collecting entity and harmonised across MIFIR and the Regulation on over-the-counter derivatives, central counterparties and trade repositories (Regulation 648/2012)[46] and determine, which transaction data would be relevant for the public and how that transaction data would be best disseminated.

As a follow-up to the new rules, ESMA published on 24 May 2024 a consultation paper[47] on commodity derivatives, covering all the key changes to the technical standards linked to the MiFID II review for commodity derivatives. It seeks stakeholders' views on the proposed amendments. On the basis of the feedback to this public consultation, ESMA is expected to finalise a report by the end of 2024 and may propose level 2 amendments on that basis.

7. Emission trends

In 2023, overall emissions in the EU ETS amounted to 1 149.1 million tonnes (Mt) CO_2eq (down from 1 361.9 Mt CO_2eq in 2022). Emissions from power and industry installations accounted for 1 095.9 Mt CO_2eq, 16.5% less than in 2022. This is the highest reduction in these emissions to date.

With this development, ETS emissions from installations are now around 47.6% below 2005 levels and well on track to achieve the 2030 target of -62%. The observed trend confirms the effectiveness and efficiency of the EU ETS as one of the main policy incentives for the decarbonisation of the European economy.

The biggest driver for the record decrease in EU ETS emissions has been the power sector, where emissions from electricity and heat production have decreased by 24% compared to 2022. This decrease is mainly due to a substantial increase in renewable electricity production

[45] The obligation to publish two reports concerns only trading venues offering both futures and options. Trading venues offering only futures will continue to publish only one report.

[46] Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories (OJ L 201, 27.7.2012). See consolidated version.

[47] Consultation Paper on the amendments to certain technical standards for commodity derivatives, ESMA, 24.05.2024

(primarily wind and solar) and gas replacing coal in power generation, facilitated by sustained average carbon prices in 2023 of over EUR 80/tCO_2.

In 2023, renewable energy was the leading source of electricity in the EU, accounting for 44.7% of all electricity production[48]. At the same time, electricity generated from fossil fuels decreased by 19.7% compared with to 2022, contributing 32.5% of the total electricity production.

With 56 GW of new solar energy capacity installed in 2023, the EU has set yet another record from the additional 40 GW installed in 2022. Onshore and offshore wind energy in the EU had a total cumulative installed capacity of 221 GW (201 GW onshore; 19 GW offshore), with 16 GW installed in 2023. Wind surpassed natural gas to become the EU's second largest electricity generation technology behind nuclear[49].

Though to a lesser extent, the emission reduction in the power sector was also driven by the recovery of hydro due to more favourable climate conditions and nuclear power, and a 2% reduction in electricity generation overall[50]. Early indications show that in the first half of 2024, around 50% of electricity generation came from renewables, with wind and solar generating more electricity than fossil fuels combined[51].

In the energy-intensive industry sectors, a reduction of emissions of 7.5% compared to 2022 was observed, due to a combination of a reduced output and efficiency gains. Output levels for installations in the scope of EU ETS are not available at time of publication. Industrial production statistics from Eurostat show that overall industrial production fell slightly in 2023 but remains higher than in 2019 and 2021 (i.e. immediately before the COVID-19 pandemic and Russia's invasion of Ukraine).

Table 4 shows the trend in ETS emissions from power and industry installations since 2019. Aviation emissions are discussed in Chapter 9.

[48] Renewables take the lead in power generation in 2023, DG Eurostat, 27.6.2024

[49] COM(2024) 404 final – State of the Energy Union report (pursuant to Regulation (EU)2018/1999 on the Governance of the Energy Union and Climate Action), 11.9.2024.

[50] Refers to net electricity production in EU27 and Norway, as reported by Eurostat.

[51] E.Graham and N.Fulghum (2024), Wind and solar overtake EU fossil fuels in the first half of 2024, 30.7.2024, EMBER

Table 4. Verified emissions from installations in the EU ETS (2019-2023) [million tonnes CO_2eq]. Data extracted from the EU Registry on 30 June 2024.

Year	2019	2020	2021	2022	2023
Verified emissions-installations	1 530	1 356 (1 253 UK excl.)	1 337	1 313	1 096
Change year-on-year	-9.1%	-11.4%	-1.4% (6.6% UK excl.)	-1.8%	-16.5%
Verified emissions-electricity and heat generation	822	696 (653 UK excl.)	708	725	552
Change year-on-year	-14.7%	-15.3%	1.6% (8.5% UK excl.)	2.4%	-23.9%
Verified emissions-industrial production	708	660 (601 UK excl.)	629	589	544
Change year-on-year	-1.6%	-6.9%	-4.7% (4.7% UK excl.)	-6.4%	-7.5%

Figure 5 and Figure 6 illustrate trends in emissions from fossil fuel combustion in installations covered by the EU ETS – as a share of installations' total emissions and by fuel type, respectively[52]. Not all emissions under the ETS originate from the combustion of fossil fuels, some emissions originate directly from industrial processes. Figure 5 shows the share of emissions from fossil fuel combustion in installations' total emissions. Figure 6 shows the breakdown of combustion emissions by fuel type.

Altogether, emissions are on a downward trend driven by the decarbonisation of the power sector (see Chapter 7) – the deployment of renewables, coal being replaced by natural gas and an increasing use of biomass[53]. As shown in Figure 6, the trend of an increased use of hard coal observed in 2022 (linked to the increase in natural gas prices due to Russia's invasion of Ukraine) has mostly reversed in 2023. In the meantime, the EU also achieved an 18%-reduction in natural gas demand between August 2022 and May 2024[54].

[52] This analysis relies on data on the implementation of the EU ETS reported by countries every year under Article 21 of the ETS Directive (deadline of 30 June). By 25 October 2024, the day this report was finalised, Italy had still not submitted their report for 2023. In the absence of the latest data for Italy, this chapter uses the data reported by Italy for 2022 as a proxy to make year-to-year comparison possible. For all other countries, 2023 data is used.

[53] Zero-rated emissions from biomass account for 20.5% on top of the ETS installation emissions in 2023.

[54] 2024 State of the Energy Union report - see footnote 49.

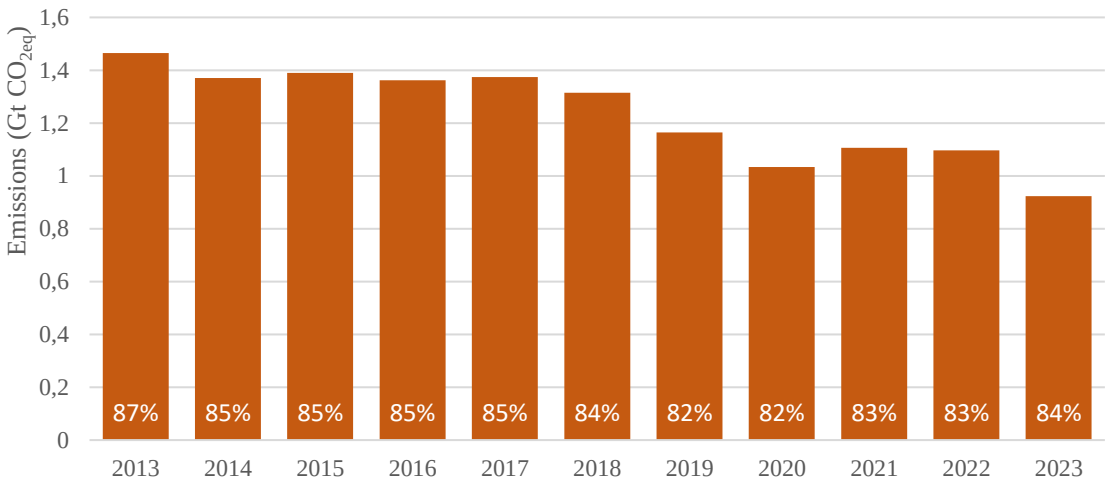


Figure 5. Trend in total emissions from fossil fuel combustion in installations covered by the EU ETS (2013-2023). Labels show the %-share of the installations' total emissions.

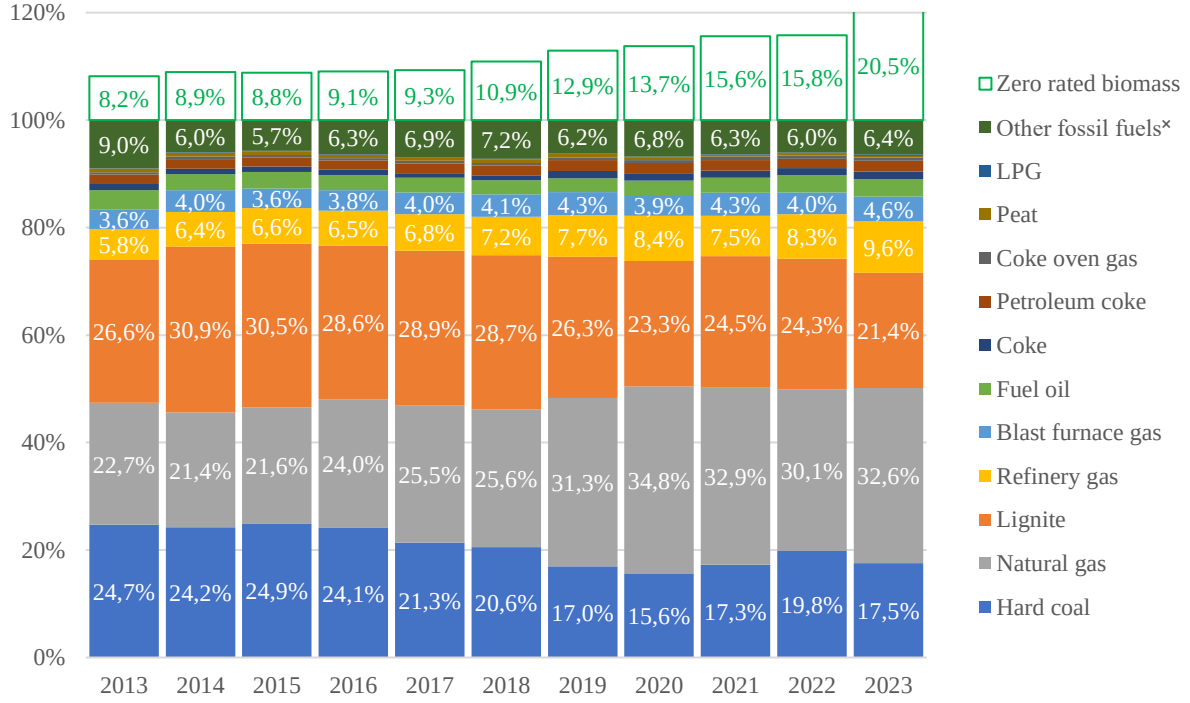


Figure 6. Trend in the share of emissions from the combustion of different fuels in installations covered by the EU ETS (2013-2023). Labels show the %-share of installations' total combustion emissions. Labels are not shown if emissions from the combustion of a particular fuel never exceed a 3%-share. Other fossil fuels refer to fuels not already listed in the legend. Emissions from the combustion of biomass are zero-rated under the EU ETS, hence they are shown on top of installations' total combustion emissions.*

8. Revenues from the EU ETS

The sale of allowances in the EU ETS auctions raises a substantial revenue for Member States to support climate action and energy transformation. In 2023, the total auction revenue amounted to EUR 43.6 billion. Of this, EUR 33 billion went directly to the Member States and

EUR 0.3 billion went to Iceland, Liechtenstein, Norway and Northern Ireland. EUR 7.4 billion supplied the ETS Innovation Fund and the ETS Modernisation Fund, and the remaining EUR 2.8 billion supplied the RRF, which Member States use to advance the clean energy transition and boost energy security – by implementing the reforms and investments included to their resilience and recovery plans. Figure 7 shows the distribution of 2023 auction revenue. Detailed revenue data per country and per fund is included in Section III of the accompanying staff working document.

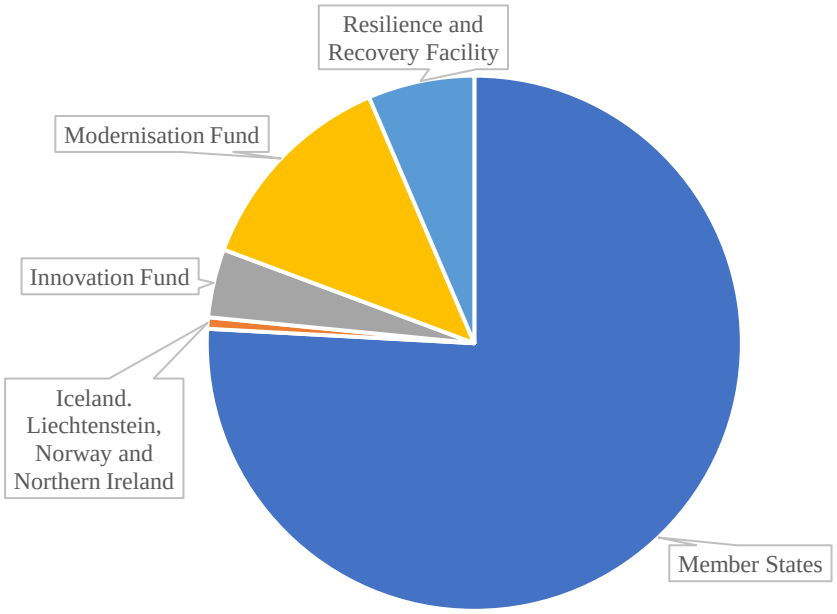


Figure 7. Distribution of 2023 ETS auction revenue between the national budgets, the Innovation and Modernisation Funds and the Resilience and Recovery Facility

With the 2023 revision of the ETS Directive, the rules on the use of auction revenue have changed. Under Article 10(3) of the ETS Directive, since June 2023 Member States are obliged to use 100% of the revenue collected (or an equivalent financial value) to support climate action and energy transformation, except for any revenue that Member States spend in aid for electricity-intensive industries for indirect carbon costs (see Chapter 8.1). The specific purposes are listed in Article 10(3) and include industrial decarbonisation, energy transformation, clean tech technologies, adaptation to climate change, decarbonisation of the transport sector and actions for just transition. The Commission will closely monitor compliance with this new obligation to ensure all ETS revenue is truly spent on these purposes.

The obligation covers the revenue from the auctioning of additional allowances due to the inclusion of maritime transport in the EU ETS, where Member States are encouraged to increase their contribution to the protection, restoration and better management of marine-based ecosystems, marine protected areas in particular. Also, Member States that receive higher volumes of additional allowances due to their high ratio of shipping companies compared to the population, should use the corresponding share for maritime-related purposes.

Member States report to the Commission every year under the Governance Regulation (Regulation 2018/1999)[55] on how they use their ETS revenue. These reports are based on templates and are publicly available[56]. The templates were updated in May 2024 to reflect the new obligation and collect more information on the revenue use[57]. Reporting must be sufficiently detailed to assess compliance with the spending target. Otherwise, the Commission may task a Member State to resubmit the information and fill any gaps.

While all relevant ETS revenue must go to climate- and energy-related investments, this budget does not need to be spent in full in the same year that the revenue is generated. Of the 2023 revenue to be used for Article 10(3) purposes, 72% was already disbursed in 2023 and another 3% was committed to specific actions. Future reports will describe how Member States have used the remainder.

Of the EUR 33 billion in ETS revenue that Member States collected in 2023, EUR 30.9 billion is subject to the obligation under the Article 10(3)[58]. EUR 2.1 billion of the 2023 revenue was reported to finance for electricity-intensive industries for indirect carbon costs. From the EUR 30.9 billion, Member States reported[59] having already disbursed EUR 22.2 billion and committed a further EUR 0.8 billion to Article 10(3) purposes. This leaves some EUR 7.9 billion still to be allocated, disbursed and reported.

Table 5 includes a split of the EUR 33 billion in ETS revenue collected by Member States in 2023. Member States also reported EUR 1.0 billion of revenues generated in earlier years as allocated (EUR 0.6 billion disbursed and EUR 0.4 committed) in 2023 on Article 10(3) purposes.

[55] Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action (OJ L 328, 21.12.2018)

[56] Use of ETS auctioning revenues - Reporting year 2024 – GovReg, Reportnet3, European Environment Agency

[57] Adopted: New templates for Member States' climate reporting, DG Climate Action, 7.5.2024

[58] Member States were encouraged to use at least 50% of the revenue collected up to 4 June 2023 to support decarbonisation and energy transformation investments. For the revenue collected from 5 June 2023 onwards, the obligation to use 100% (or equivalent financial value) to support decarbonisation and energy transformation in ETS sectors applies.

[59] Some countries that co-fund actions with their ETS revenue report the full value of the co-funded action; therefore, the sum of their actions is higher than their revenue. The values in this chapter were adjusted for this, e.g., if the sum of actions was twice the generated revenue, it was assumed that half of each action and indirect carbon cost compensation was paid from the auction revenue.

Table 5. Split of the EUR 33 billion in ETS revenue collected by Member States in 2023

	Revenue (EUR billion)
Revenue reported as used to finance aid for carbon costs	2.1
Revenue subject to the Article 10(3) obligation and disbursed in 2023	22.2
Revenue collected by Member States in 2023, subject to the Article 10(3) obligation and committed	0.8
Revenue collected by Member States in 2023, still to be allocated, disbursed and reported	7.9

As illustrated in Figure 8 of the EUR 22.2 billion in revenue reported as disbursed in 2023 on Article 10(3) purposes, EUR 9.7 billion was used for projects in the 'Energy supply, grids and storage' category, EUR 2.3 billion for 'Energy efficiency, heating and cooling in buildings' and EUR 5.1 billion for 'Public transport and mobility'. Of the 323 actions reported in these three categories, examples include the installation of photovoltaics system in Romania, grants for energy efficiency improvements for low-income households in France and the expansion of the metro networks in Lisbon and Porto in Portugal.

In addition, Member States reported having allocated EUR 0.7 billion to projects in the category 'Industry decarbonisation (low-carbon technologies, CCUS and energy efficiency in industrial sector excl. energy sector)', including financial and technical support to businesses in the Walloon region of Belgium in their transition towards a net-zero economy. Member States also reported having allocated EUR 2.7 billion to 'Social support and just transition', including the Greek Energy Transition Fund (covering among other energy subsidies for low-income households, business support in transitioning areas, reskilling programmes and green infrastructure projects).

For EUR 1.4 billion in 2023 disbursements, Member States reported the 'Other' category, which includes actions that do not fit any other categories or fit multiple categories. Examples include the Swedish Climate Leap fund that supports various emission reduction, biogas, biodiversity and research projects.

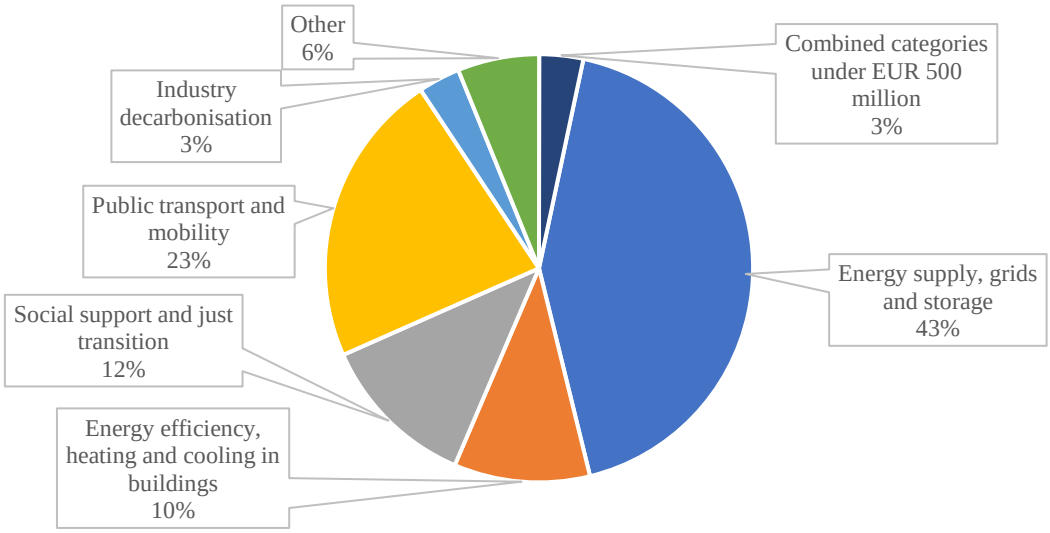


Figure 8. Split of the EUR 22.2 billion of the 2023 ETS auction revenue reported as disbursed, per category. Combined categories under EUR 500 million include (in EUR million) road transport (309), adaptation (155), international purposes and international climate finance (110), LULUCF, agriculture and land-based removals (59), administrative expenses (54), waste management (29), maritime transport (17), aviation (13) and permanent removals (3).

The EU ETS auction revenue has been an essential contribution to these and many other impactful projects in the Member States. These projects have not only helped to reduce emissions, but also ensure that the green transition is just. Case-studies of 13 projects (co-) financed from auctioning revenues demonstrate the positive effects of the revenues on the climate transition in the EU[60]. Importantly, Member States must make effort to ensure the visibility of the source of the funding for the actions or projects funded from the ETS revenue to show the EU ETS' contribution to progressive decarbonisation and the just transition. This has been lacking for most of the actions reported for 2023 and the Commission is looking to follow-up.

An overview of how each Member State used their ETS revenue is included in the staff working document accompanying the 2024 Climate action progress report[61].

8.1. Aid for indirect costs

Member States can grant state aid to certain electricity-intensive industries under the EU ETS for the carbon costs arising from indirect emissions, specifically from increased electricity prices due to energy companies passing on the cost of buying allowances to business consumers. The Commission adopted EU ETS state aid guidelines to harmonise

[60] Climate and Energy in the EU, Use of ETS auctioning revenues, Good practices, European Environment Agency 11.10.2024

[61] COM(2024) 498 - 2024 Climate action progress report and the accompanying staff working document (to be published)

implementation of this aid between Member States and minimise competition distortions in the single market[62].

In 2023, 15 Member States paid for indirect costs incurred in 2022, having notified their schemes to the Commission for state aid assessment and having received acknowledgement of their compatibility with the single market. Austria, Greece and Slovenia introduced new schemes, while the Netherlands paused their scheme[63]. Under the schemes implemented by Member States, beneficiaries should re-invest part of the aid in projects that lower their direct or indirect carbon footprint and with this, their exposure to carbon leakage risk.

Within 3 months after the end of each year, Member States with an indirect cost compensation scheme in place must publish the total compensation amount paid, including a breakdown per recipient sector and subsector. Table 6 summarises the data published by Member States on the aid paid in 2023 for indirect costs incurred in 2022. These amounts are also compared with 2022 auction revenues.

The total indirect cost payments by these 15 Member States in 2023 amounted to around EUR 3.95 billion. This is more than the EUR 2.16 billion disbursed in 2022, which is an approximate 80%-increase of indirect cost payments. The number of installations that received aid increased slightly (by 56) as more Member States were implementing schemes for indirect costs.

Aid for indirect carbon costs in a given year is based on the forward price of allowances in the previous year. Therefore, the aid disbursed in 2023 for the costs incurred in 2022 is based on the average forward price in 2021. This price was EUR 54.1, which is more than double the EUR 25.09 used for indirect costs incurred in 2021. This forward price has since increased, to over EUR 80 in 2022 and 2023, meaning that aid for indirect costs incurred in 2023 and 2024 will be based on a higher carbon price. Indirect cost compensation schemes typically have a maximum budget calculated for the whole application period (which for most Member States covers 2021-2030).

The indirect cost payments also increased in relative terms. The total payments for indirect costs incurred in 2022 were equivalent to 16% of the 2022 auction revenue collected by the 15 Member States, compared to payments reaching 10% of the revenue collected in 2021 by 13 Member States awarding aid for that same year. To a large extent, this was driven by the decrease in the absolute volume of auctioned allowances in 2022 as well as the increase in the forward price mentioned above.

[62] Guidelines on certain state aid measures in the context of the system for greenhouse gas emission allowances trading scheme post-2021 (OJ C 317, 25.9.2020)

[63] In addition, Portugal adopted an indirect cost scheme at the end of 2022.

Table 6. Aid amounts paid out in 2023 from the ETS auction revenue for indirect costs incurred in 2022

Member State	Amount paid for indirect costs incurred in 2022 [million EUR]	Number of recipients (installations)	Auction revenues in 2022[64] [million EUR]	Relative size of indirect costs aid compared to auction revenue
Austria	184.8	76	375.4	49.2%
Belgium	186.2	59	649.2	28.7%
Czechia	50.3	21	670.6	7.5%
Finland	117.7	49	504.7	23.3%
France	604.2	280	1834.7	32.9%
Germany	1 643.7	668	6 772.4	24.3%
Greece[65]	171.5	53	1 314.0	13.1%
Italy	150.6	251	3 166.1	4.8%
Luxembourg	25.0	4	4.8	517.0%
Poland	372.7	95	4 966.4	7.5%
Portugal[66]	25.0	22	661.6	3.8%
Romania	145.0	30	482.4	30.1%
Slovakia	20.9	9	342.4	6.1%
Slovenia	26.0	17	170.5	15.3%
Spain	228.8	185	3 186.8	7.2%

Member States that spend more than 25% of their auction revenue on indirect costs in any year are required to publish a report explaining why they exceeded this threshold. In 2023, most Member States stayed well below this threshold. Nevertheless, five Member States spent more than 25% of their auction revenue on indirect cost payments: Austria, Belgium, France, Luxembourg and Romania. Justifications provided by these Member States are summarised below.

Austria reported that a temporary scheme was adopted in 2022 with compensation permitted to exceed 25% because of high electricity prices and Russia's invasion of Ukraine. In Belgium

[64] Excluding revenues from the auctioning of aviation allowances.

[65] In the case of Greece, payments of EUR 86.1 million were made in 2023 for indirect costs incurred in 2021, in addition to the aid shown in the table.

[66] In the case of Portugal, EUR 24.6 million of aid was disbursed to 26 installations in 2022 for indirect costs incurred in 2022, in addition to the aid shown in the table.

and France, the high proportion of auction revenue paid was attributed to the country's high share of low-carbon electricity generation, leading to relatively low auction revenues compared to its share of electro-intensive industries. Romania reported that the 25% threshold was exceeded partly due to the increase in the carbon price used to calculate payments.

Luxembourg's expenditure far outweighed its total auction revenue. Although the country's payments increased in 2023, the increase in revenue share was also attributed to a drop in the country's auction volume caused by its use of ETS allowances for offsetting emissions in the sectors covered by the Effort Sharing Regulation. This practice is referred to as 'Effort Sharing Regulation flexibility'[67]. Overall, Luxembourg received 35% less revenue in 2022 than in 2021. Both Luxembourg and Romania also mentioned that the transfer of allowances into the MSR contributed to a reduction in the volume of auctioned allowances.

8.2. ETS Innovation Fund

The Innovation Fund is one of the world's largest funding programmes for rolling out low- and zero-carbon innovative solutions and technologies in energy, industry and net-zero mobility, funded entirely by the EU ETS. The Fund provides grants for projects aimed at commercialising innovative low-carbon technologies and bringing industrial solutions to market to decarbonise Europe and support the transition to climate neutrality. With an estimated budget of EUR 40 billion available (based on a carbon price of EUR 75/tCO_2), the Innovation Fund has launched eight calls for proposals since 2020, including one for auctions under the European Hydrogen Bank.

The Commission reports in more detail on implementation of the Innovation Fund separately. The second progress report on implementation of the Innovation Fund is expected in Q4-2024[68].

Following the 2022 round of calls, 39 large-scale and 15 small-scale projects signed grant agreements. Over EUR 3.5 billion will fund innovation, including in energy-intensive industries, hydrogen production, renewable energy generation and the manufacturing of components for energy storage and renewables, and help advance decarbonisation in

[67] The Effort Sharing Regulation creates a one-off flexibility whereby Member States can have up to a maximum of 100 million ETS allowances collectively cancelled in 2021-2030, so they can comply with their respective greenhouse gas emission reduction targets under this Regulation. The flexibility is for Member States with targets significantly above both the EU average and their potential to make cost-effective reductions, as well as Member States that did not allocate any free EU ETS allowances to industrial installations in 2013 (nine countries in total: Austria, Belgium, Denmark, Finland, Ireland, Luxemburg, Malta, Netherlands and Sweden. A cancellation is made from the auctioning volume of the Member State concerned under Article 10 of the ETS Directive. The eligible Member States notified the use of 21 641 364 allowances under the Effort Sharing Regulation flexibility in 2021-2023.

[68] Report from the Commission to the European Parliament and the Council on the implementation of the Innovation Fund (COM/2022/416 final)

17 countries[69]. About EUR 55 million will fund small-scale innovation in several hard-to-abate sectors, including biofuels, glass and ceramics, cement, energy storage and renewables[70].

With projects awarded support in Denmark, Greece, Hungary and Latvia, the sectoral and geographical balance of the Innovation Fund has further improved. By June 2024, the total Innovation Fund portfolio counted 127 projects either under implementation or in the process of having a grant agreement prepared, with an EU ETS contribution of EUR 7.35 billion[71]. When completed, it is estimated that these projects will save around 457 Mt CO_2eq in emissions in their first 10 years of operation.

The incentive provided by the EU ETS carbon price is much larger for these projects than the amount of the EU ETS-sourced funding. For example, the avoided carbon cost benefit to companies' business cases from the projects supported by the Innovation Fund so far is around EUR 34 billion (carbon costs avoided due to lower emissions at an average carbon price of EUR 75/tCO_2). This reflects the EU ETS logic whereby the carbon price is the main long-term incentive, while the Innovation Fund supplements this incentive to accelerate change[72].

In parallel, 27 unsuccessful projects from the third round of calls (both large- and small-scale) were selected for project development assistance under the Innovation Fund. Since the beginning of the programme, 70 projects have been awarded project development assistance, creating a strong pipeline of future good quality applications. This support amounts to EUR 24 million and is provided by the European Investment Bank (EIB).

The 2023 Innovation Fund Call for net-zero technologies (IF23 NZT Call) closed on 9 April 2024, having received 337 applications. It included dedicated topics for cleantech manufacturing and pilot projects, in addition to three general decarbonisation topics, organised into small-, medium-, and large-scale projects. The IF23 NZT Call already reflected the extended application of emissions trading to buildings, road transport and particularly to the maritime sector with specific provisions to accelerate its decarbonisation, including in relation to the production and uptake of renewable and low-carbon fuels.

The results of the IF23 NZT Call are expected in Q4-2024, with grant agreements expected to be signed at the beginning of 2025. Approximately EUR 4 billion will be provided to fund innovative low-carbon and net-zero technologies. For the first time, projects that meet the minimum thresholds for all award criteria will receive the STEP (Strategic Technologies for Europe Platform) Seal, introduced by the STEP Regulation (Regulation 2024/795)[73].

[69] The projects will contribute to the decarbonisation of 16 Member States (Austria, Belgium, Croatia, Czechia, Denmark, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, the Netherlands, Portugal, Spain and Sweden), plus Norway.

[70] 16 grants from the EU's Innovation Fund awarded to projects across Europe, DG Climate Action, 6.6.2023

[71] Updated portfolio of projects signed under the Innovation Fund

[72] Recital 20 of Directive 2009/29/EC, reaffirmed in recital 14 of Directive (EU) 2018/410

[73] Regulation (EU) 2024/795 of the European Parliament and of the Council of 29 February 2024 establishing the Strategic Technologies for Europe Platform (STEP), (OJ L, 2024/795, 29.2.2024)

The Seal is the EU quality label awarded to high-quality projects that contribute to the STEP objectives. For the projects in question, it will facilitate access to funding from Member States.

The 2023 revision of the ETS Directive introduced competitive bidding ('auctions') under the Innovation Fund, and the first pilot auction for the production of renewable fuel of non-biological origin hydrogen (RFNBO H_2) ran from 23 November 2023 to 8 February 2024 (IF23 Auction). The IF23 Auction attracted 132 bids from 17 countries across Europe, asking for 15 times the available budget, indicating significant oversubscription. The evaluation results were published at the end of April 2024.

Seven bids were selected in the IF23 Auction for grant agreement preparation, for a total of EUR 720 million in EU contributions[74]. The selected projects submitted bids of between EUR 0.37 and EUR 0.48 per kilogram of RFNBO H_2 produced. Based on the pay-as-bid design of the pilot auction, these projects will receive Innovation Fund grants ranging from EUR 8 million to EUR 245 million. The grant agreements are expected to be signed in October 2024.

With this first pilot auction, the Innovation Fund also tested the 'Auction-as-a-Service' feature, allowing EEA countries to use the IF auction to allocate additional national funds to national projects that did not fit within the Innovation Fund auction budget. Germany contributed EUR 350 million to a national funding window in the pilot auction. Similarly, DG Climate Action is working closely with DG Competition to set up a similar feature for regular calls for proposals, called 'Grants-as-a-Service.' Both features enable EEA countries to leverage the well-established IF evaluation procedures and avoid unnecessary administrative burdens in developing and running new support schemes for the same technologies.

8.3. ETS Modernisation Fund

The Modernisation Fund is a solidarity programme financed by the EU ETS. It supports 10 lower-income Member States[75] and from 2024, 13 lower-income Member States[76] in meeting the 2030 climate and energy targets by helping them roll out projects that modernise energy systems and improve energy efficiency. The Fund's budget comes from auctioning a share of the EU ETS cap (corresponding to 438 million allowances), allocated among the beneficiary Member States according to a fixed key[77]. In addition, six beneficiary Member States have transferred 320 million allowances from phase 3 of the EU ETS (2013-2020) to the Modernisation Fund. This brings its total size to over 750 million allowances, or EUR 56 billion from 2021 to 2030 assuming an average carbon price of EUR 75/tCO_2.

[74] Three projects from Spain, two from Portugal and a project in in Finland and in Norway.

[75] The first beneficiary Member States were Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovakia.

[76] Greece, Portugal and Slovenia were added to the original 10 Member States in the 2023 revision of the ETS Directive.

[77] Annex IIb to the ETS Directive – Modernisation Fund allocation key

Although Member States select the investments they wish to support, they are required to use most of their resources under the Fund for priority investments. These include the generation and use of renewable electricity, heating and cooling, energy efficiency, storage and the modernisation of energy networks, support for low-income households to address energy poverty and actions for just transition in fossil-dependent regions. The EIB reviews the investment proposals. The Commission takes a disbursement decision once the EIB confirms an investment as priority or recommends for financing by the Fund's Investment Committee as a non-priority. Disbursement decisions are issued in two cycles, every year, covering investments in all beneficiary Member States.

Since January 2021, 176 schemes and individual projects have been confirmed for a total amount of EUR 12.7 billion, which has been disbursed to beneficiary Member States. These initiatives mostly relate to renewable electricity, energy efficiency, energy storage and the modernisation of energy networks. Table 7 presents the amounts disbursed for each Member State.

In June 2024, the Commission adopted the seventh disbursement decision[78] under the Modernisation Fund, second largest since 2021. On this basis, the EIB made payments for a total of EUR 2.9 billion to 10 beneficiary Member States[79] to finance 39 investment proposals. Projects include support to households for the acquisition and installation of new photovoltaic systems in Czechia and contract-for-difference support schemes to produce electricity from renewable sources in Romania.

Submissions for another round of proposals under the Modernisation Fund closed on 13 August 2024 for non-priority projects and on 10 September 2024 for priority projects.

The revision of the ETS Directive has brought significant changes to the Modernisation Fund's size and governance. The size of the Fund has been increased by 110 million allowances. This top-up is shared between 13 beneficiary Member States – the 10 original beneficiaries plus Greece, Portugal and Slovenia. A higher share of resources under the Fund has been allocated to the list of priority investments, which has been extended to include renewable heating and just transition in carbon-dependent regions. Investments involving gas have been subject to a number of restrictions. As of 2025, investments must also comply with the 'do no significant harm' requirements under the Taxonomy Regulation. In view of the revision, the Modernisation Fund Regulation (Regulation 2020/1001)[80] has been amended. It entered into force on 1 January 2024.

[78] C(2024) 4190 final - Commission Decision of 12.06.2024 on the disbursement of revenues from the Modernisation Fund under Directive 2003/87/EC - First biannual disbursement cycle of 2024

[79] The fifth disbursement decision under the Modernisation Fund authorised payments to Romania (EUR 1.1 billion), Czechia (EUR 835 million), Poland (EUR 698 million), Hungary (EUR 77 million), Bulgaria (EUR 65 million), Lithuania (EUR 59 million), Croatia (EUR 52 million), Slovakia (EUR 35 million), Latvia (EUR 27 million) and Estonia (EUR 24 million).

[80] Commission Implementing Regulation (EU) 2020/1001 of 9 July 2020 laying down detailed rules for the application of Directive 2003/87/EC as regards the operation of the Modernisation Fund supporting investments to modernise the energy systems and to improve energy efficiency of certain Member States (OJ L 221, 10.7.2020)

Table 7. Total disbursements from the Modernisation Fund (from 1 January 2021 to 30 June 2024)

Beneficiary Member State	Disbursed amounts (million EUR)
Bulgaria	262
Czechia	4 343
Estonia	178
Croatia	262
Hungary	185
Lithuania	183
Latvia	32
Poland	1 908
Romania	4 679
Slovakia	615
Total	**12 647**

8.4. ETS Decarbonisation Fund for Greece

Article 10a(9) of the ETS Directive grants Greece the right, under certain conditions, to claim up to 25 million allowances for the decarbonisation of the electricity supply of its islands[81]. Greece, the European Commission and the EIB are working to operationalise this provision. The EIB will be responsible for assessing the financial viability and socio-economic benefits of the Greek project proposal to decarbonise the electricity supply of its islands. If all conditions are fulfilled, including the EIB's confirmation of Greece's project proposal submitted under Article 10a(9), the allowances would be auctioned and the revenues made available for the co-financing of up to 60% of approved project components. In concrete terms, the funding should support renewable energy supply projects on the islands and help connect islands with the mainland's electricity grid.

9. Aviation

The EU ETS has regulated emissions from the aviation sector since 2012. Legally, the system covers all outgoing flights from and all incoming flights to the EEA. In 2013, however, the EU limited ETS obligations for the aviation sector to flights within the EEA, to support

[81] 25 million allowances have been set aside for possible use under Article 10a(9) of the ETS Directive (Communication from the Commission Publication of the total number of allowances in circulation in 2021 for the purposes of the Market Stability Reserve under the EU Emissions Trading System established by Directive 2003/87/EC and of the number of unallocated allowances during the period 2013-2020 2022/C 195/02, C/2022/2780 (OJ C 195, 13.5.2022).

the development of a global market-based measure to reduce aviation emissions by the International Civil Aviation Organization (ICAO)[82]. The limitation of the ETS Directive coverage has since been extended three times and the 2023 revision of the ETS Directive emphasises that it should be the last time-bound derogation to the EU ETS[83].

Between 2013 and 2023, the EU ETS achieved a total reduction in aviation net CO_2 emissions of 206 Mt through funding of emissions reductions in other sectors. In 2012-2020, aviation operators used nearly 19 million international credits for compliance in the EU ETS.

Since 1 January 2020, the EU ETS covers emissions from outgoing flights to Switzerland, while the Swiss ETS applies to flights departing to EEA airports. This ensures a decarbonisation incentive while levelling the playing field in both directions. As of 1 January 2021, the EU ETS applies to outgoing flights to the UK, while the UK ETS applies to flights departing to EEA airports. This maintains the carbon pricing coverage of aviation emissions despite the UK's departure from the EU.

Since 1 January 2024, the EU ETS covers emissions from most flights[84] to and from the EU's nine outermost regions as well as emissions from departing flights from the outermost regions to Switzerland and to the UK. Altogether, this amounts to an extension of ETS carbon pricing coverage of around 7%. Switzerland has also included emissions from flights departing to the outermost regions in its ETS since 2024[85].

In parallel, to facilitate progress at ICAO, the limited, intra-European scope of the EU ETS for aviation was extended until the end of 2026 as all major third countries should be applying the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) from 2027. 129 states participate in the voluntary phase of CORSIA that runs from 2024 to 2026.

In 2023, around 26 million aviation allowances were issued in line with the applicable scope of the EU ETS. Free allocation amounted to 22.5 million allowances. Aircraft operators administered by national administrators in the EEA received a little less than 0.5 million Swiss aviation allowances for free under the Swiss ETS. Approximately 5.7 million aviation allowances were auctioned in 2023.

Emissions from aircraft operators continued to increase in 2023 compared to 2022. In 2023, emissions amounted to 54.1 Mt CO_2eq (including 0.9 Mt of operators administered by Switzerland), up from 49.5 Mt in 2022. EU ETS aviation emissions are close to 2019 levels (adjusted for the UK's departure from the EU), confirming the return to pre-COVID-19

[82] Decision No 377/2013/EU of the European Parliament and of the Council of 24 April 2013 derogating temporarily from Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community (OJ L 113, 25.4.2013)

[83] Recital 30 of Directive 958/2024/EU revising the ETS Directive

[84] A temporary derogation from the EU ETS is provided until 2030 for emissions from flights between an aerodrome in an outermost region in one Member State and an aerodrome in the same Member State.

[85] Additional free allocation for flights to outermost regions, Emissions trading system for aircraft operators, Federal Office for Environment, 31.8.2024

pandemic emission levels[86]. Table 8 sets out verified emissions from aircraft operators, along with the volumes of allowances allocated for free and auctioned in the aviation sector since 2019. Since 2021, the EU ETS no longer covers incoming flights from the UK.

As part of the 'Fit for 55' package, two reforms concerning the EU ETS for aviation were adopted in 2023 – to advance emission reductions in the sector[87] and to implement CORSIA for extra-European flights of EU-based airlines in EU law[88]. Their implementation is underway.

To implement CORSIA in EU law, the Commission adopted in February 2024 the list of states considered to be applying CORSIA for emissions in 2023[89]. This list is updated annually. In July 2024, the Commission published the rules for calculating offsetting requirements under CORSIA[90]. The competent authorities in the Member States will use these rules for emissions until the end of 2026.

In a significant step to improve transparency, the Commission published in March 2024 aggregated annual emissions data from aviation activities in 2022[91]. This publication followed a Commission statement[92] issued during the legislative process for the 2023 revision of the ETS Directive. The Commission has committed to publishing more data on international aviation emissions, while protecting commercially sensitive data.

[86] European Aviation Overview 24-30 May, Eurocontrol, 1.6.2023

[87] Directive (EU) 2023/958 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC as regards aviation's contribution to the Union's economy-wide emission reduction target and the appropriate implementation of a global market-based measure (OJ L 130, 16.5.2023)

[88] Decision (EU) 2023/136 of the European Parliament and of the Council of 18 January 2023 amending Directive 2003/87/EC as regards the notification of offsetting in respect of a global market-based measure for aircraft operators based in the Union (OJ L 19, 20.1.2023)

[89] Commission Implementing Regulation (EU) 2024/622 of 22 February 2024 on the list of States which are considered to be applying CORSIA for the purposes of Directive 2003/87/EC of the European Parliament and of the Council for emissions in 2023 (OJ L, 2024/622, 23.2.2024)

[90] Commission Implementing Regulation (EU) 2024/1879 of 9 July 2024 laying down rules for the application of Directive 2003/87/EC of the European Parliament and of the Council as regards the calculation of offsetting requirements for the purpose of CORSIA (OJ L, 2024/1879, 10.7.2024)

[91] Publication of 2022 emissions data from aviation, DG Climate Action, 8.3.2024

[92] Commission statement, 20.4.2023

Table 8. Aviation in the EU ETS (2019-2023) – verified emissions [million tonnes CO_2eq], free allocation and allowances auctioned [million allowances]

Year	2019	2020	2021[59]	2022	2023
Verified emissions-aviation	68.2	25.2	27.9	49.5	54.1
Change year-on- year[93]	+1%	−63%	+30%	+77%	+9.5%
Free allocation (EU27 + Iceland, Liechtenstein, and Norway + UK + Switzerland)[94]	31.3[95]	32.5	24.0	23.1	22.5
Free allocation from the special reserve for new entrants and fast-growing operators	1.0	0.8	0.3	0.25	0.23
Volumes of allowances auctioned	5.5	9.2	3.8	3.7	5.7

The 2023 revision of the ETS Directive advances the implementation of the polluter pays principle in the aviation sector. Free allowances for aircraft operators will be gradually phased out by the end of 2025. In 2024, 25% fewer free allowances are allocated to aircraft operators.

At the same time, 20 million allowances (with an estimated current market value of around EUR 1.5 billion at a carbon price of EUR 75/tCO_2) are earmarked to further support the uptake of eligible alternative fuels. This support increases the financial incentive provided by the EU ETS to alternative fuels over fossil fuels, where zero-rating gives a financial incentive above EUR 200 per tonne of fuel. This incentive has been available for eligible fuels uplifted on ETS routes since 1 January 2024. The ongoing revision of the Energy Taxation Directive is expected to increase this incentive further.

Recognising that non-CO_2 aviation effects can no longer be ignored[96], a dedicated monitoring, reporting and verification framework has been introduced and will start to apply on 1 January

[93] Considering the updated scope of aviation in the EU ETS (without incoming flights from the UK). Data from aircraft operators administered by Switzerland is included in 2020-2023 entries only.

[94] These numbers do not take into account all closures of aircraft operators and free allowances from the special reserve for new entrants and fast-growing operators, nor returns in 2012 due to the change in scope. Sources: EUTL, DG Climate Action.

[95] Taking into account the numbers withheld due to closures of aircraft operators, the real allocation for 2019 would be 4 million below the figure provided (see footnote 8 in Notice C/2020/8643, OJ C 428, 11.12.2020). The allocation for the UK (4.31 million allowances of the total for 2019) was suspended in 2019 due to the safeguard measures adopted by the Commission to protect the environmental integrity of the EU ETS in cases where EU law ceases to apply to a Member State withdrawing from the EU. The allocation resumed in 2020.

[96] The overall impact of global aviation on climate is considerably higher than the CO_2 component alone. The overall impact of aviation is estimated to be two to four times that of CO_2 emissions when the non-CO_2 effects are considered. Addressing these emissions is relevant as the Intergovernmental Panel on Climate Change (IPCC) has singled out international aviation (and shipping), in its Sixth Assessment Report on mitigation of climate change, as sectors with climate goals that fall short of what would be required to curb global temperature increase in line with the Paris Agreement.

2025. The implementing rules were set out in the second revision of the Monitoring and Reporting Regulation, adopted on 29 August 2024[97].

10. Maritime transport

Maritime transport is a major emitter of CO_2, accounting for around 3-4% of the EU's total CO_2 emissions, i.e. over 126 Mt in 2023, when considering all emissions from voyages to and from EEA ports. The 2023 revision of the ETS Directive extended the EU ETS to emissions from maritime transport activities, as from 1 January 2024. Maritime transport emissions are included in the scope of the EU ETS for 50% of emissions from voyages starting or ending outside of the EEA and 100% of emissions that occur between two ports and when ships are within an EEA port. Taking this scope into consideration the EU ETS covered 85 Mt CO_2 from maritime transport in 2023.

This extension of the EU ETS builds on the provisions in place for other sectors it covers as well as Maritime MRV Regulation (Regulation 2015/757 on the monitoring, reporting and verification of GHG emissions from maritime transport)[98]. In 2024 and 2025 (the first 2 years of implementation), the EU ETS will cover CO_2 emissions from large ships calling at EEA ports, regardless of the flag they fly. This will be extended to CH_4 (methane) and N_2O (nitrous oxide) emissions as from 2026.

The obligation for the maritime sector to surrender allowances for their emissions under the EU ETS will be introduced gradually. During an initial phase-in period, shipping companies will be obliged to surrender allowances only for a portion of their emissions, according to the following timeframe:

- 2025: for 40% of their emissions reported in 2024;
- 2026: for 70% of their emissions reported in 2025;
- 2027 onwards: for 100% of their reported emissions in 2026 and later years.

To ensure the environmental integrity of the EU ETS, when fewer allowances are surrendered compared to the verified emissions from maritime transport in 2024 and 2025, Member States will cancel the number of allowances corresponding to that difference.

The revision of the Maritime MRV Regulation and the relevant secondary legislation was finalised in 2023. In total, eight implementing and delegated acts were adopted[99] to make the EU ETS for maritime transport operational as from 2024. The Commission, supported by

[97] New monitoring rules agreed for the EU ETS, including non-CO_2 emissions from the aviation sector, DG Climate Action, 30.8.2024

[98] Regulation (EU) 2015/757 of the European Parliament and of the Council of 29 April 2015 on the monitoring, reporting and verification of greenhouse gas emissions from maritime transport, and amending Directive 2009/16/EC (OJ L 123, 19.5.2015)

[99] These include Implementing Regulation (EU) 2023/2297, Implementing Regulation (EU) 2023/2449, Implementing Regulation (EU) 2023/2599, Delegated Regulation (EU) 2023/2776, Delegated Regulation (EU) 2023/2849, Implementing Decision (EU) 2023/2895, Delegated Regulation (EU) 2023/2917, Implementing Decision (EU) 2024/411.

the European Maritime Safety Agency, has been helping stakeholders with implementation through communication and awareness initiatives, including guidance documents[100].

The inclusion of emissions from maritime transport in the EU ETS is part of the EU's overall strategy to decarbonise the sector. As with all the maritime-related legislation of the 'Fit for 55' package[101], it will incentivise energy efficiency and low-carbon solutions, as well as help reduce the price difference between alternative low-carbon fuels and traditional fossil maritime fuels. Ships falling under the scope of the EU ETS will submit emission data for the first reporting period (2024) by 31 March 2025 and surrender the corresponding number of emission allowances by 30 September 2025. Just as for other EU ETS sectors, the competent authorities in the Member States will be primarily responsible for implementing the system. This entails inspection and enforcement activities as well as approval of the monitoring plans, submitted by ships, once assessed by accredited verifiers.

The ETS Directive includes a reporting and review clause to monitor the implementation of the EU ETS for maritime transport, in particular to detect and address any evasive behaviour at an early stage, and to assess relevant developments in the International Maritime Organization, where the EU is supporting the development of a global GHG emission pricing mechanism for shipping together with a fuel standard regulating the phased reduction of the marine fuel's GHG intensity. In addition, in 2026 the Commission will review the EU ETS for maritime transport and explore a potential extension of its scope to ships below 5 000 gross tonnage but not below 400 gross tonnage.

11. EU ETS implementation framework

A smoothly functioning and environmentally credible EU ETS hinges on a robust framework of monitoring, reporting, verification and accreditation requirements. These requirements are harmonised in the Monitoring and Reporting Regulation and the Accreditation and Verification Regulation (Regulation 2018/2067)[102]. Countries are required to report on their implementation of these Regulations and of the ETS Directive every year.

This chapter relies on the data on the implementation of the EU ETS that countries report every year under Article 21 of the ETS Directive (deadline of 30 June). By 25 October 2024, the day this report was finalised, Italy had still not submitted their report for 2023. In the absence of the latest data for Italy, this chapter uses the data reported by Italy for 2022 as a proxy to make year-to-year comparison possible. For all other countries, 2023 data is used.

[100] See Commission's website Reducing emissions from the shipping sector for further information.

[101] In addition to the extension the EU ETS to maritime transport, these measures include an initiative to boost demand for sustainable alternative fuels (the FuelEU Maritime initiative amending Directive 2009/16/EC), and the revision of existing directives on energy taxation (Directive 2003/96/EC), alternative fuel infrastructures (Directive 2014/94/EU), and renewable energy (Directive (EU) 2018/2001).

[102] Commission Implementing Regulation (EU) 2018/2067 of 19 December 2018 on the verification of data and on the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council (OJ L 334, 31.12.2018). The regulation was amended in 2020 by Commission Regulation (EU) 2020/2084 and in 2024 by Regulation (EU) 2024/1321. See consolidated text.

11.1. Monitoring and reporting of emissions

The emissions monitoring system in the EU ETS relies on a building-block approach. It gives operators a high degree of flexibility, therefore ensuring both the cost-efficiency and reliability of emissions data. Operators may use several monitoring approaches ('calculation-based' or 'measurement-based' and by exception the 'fall-back approach'), including a combination of methods for individual parts of an installation. For aircraft operators, only calculation-based approaches are allowed, with fuel consumption being the central flight parameter.

The Monitoring and Reporting Regulation requires both installations and aircraft operators to have a monitoring plan approved by the national competent authority. This prevents them from making an arbitrary selection of monitoring methodologies and temporal variations. In 2023, 5 countries[103] (same as in 2022) continued to allow installations to use simplified monitoring plans in low-risk cases[104]. For aviation, this provision is no longer in use for operators with low emissions in any country.

Most installations have fully complied with the legal requirements for emissions monitoring. Most used the calculation-based methodology[105] to calculate their emissions. Only 151 installations (1.8%) in 22 countries reported using continuous emissions measurement systems (CEMS), 7 more than in 2022. Of these, 94 installations used CEMS to measure CO_2 emissions, 43 to measure N_2O and 14 to measure both gases. CEMS is used most frequently in Germany and Czechia. In 39 installations, the measured emissions also contained biogenic CO_2. Of the installations using CEMS, 72 used the methodology for more than 95% of their emissions, while the other 79 used a combination of CEMS and a calculation-based methodology.

Only 10 countries reported using the fall-back approach. This approach was used for 23 installations covering approximately 2.6 Mt CO_2eq (4 fewer installations than in 2022 but similar in emissions' terms). One installation in the Netherlands is responsible for 56% of the overall emissions reported using the fall-back methodology due to its complex set-up.

Most installations met the minimum tier requirements[106] of the Monitoring and Reporting Regulation in 2023. Only 98 category C installations (up from 96 in 2022) were reported to have deviated in at least one parameter from the requirement to apply the highest tiers for major source streams. They were located in 17 different countries (same as in 2022) and represented 15.9% of category C installations. These deviations are only authorised when the operator demonstrates that meeting the highest tier is not technically feasible or incurs unreasonable

[103] These Member States were Denmark, Finland, Hungary, Lithuania, and the Netherlands. Croatia no longer reports using simplified reporting.

[104] Article 13 of the Monitoring and Reporting Regulation

[105] The main reason for this is that the measurement-based methodology involves significant resources and know-how, which many smaller operators lack.

[106] The Monitoring and Reporting Regulation requires all operators to meet certain minimum tiers. Installations emitting more than 50 kt of CO_2 are required to meet the highest tier for major source streams (meaning more reliable data quality, while less strict requirements apply to smaller sources for cost-efficiency reasons.

costs. Once these conditions no longer apply, the operator must improve the monitoring system accordingly.

The Monitoring and Reporting Regulation was first amended in October 2023 to implement the 2023 revision of the ETS Directive[107]. Key amendments related to the monitoring and reporting rules for the new ETS2 (see Chapter 2). In addition, the updated rules reflect the obligation for installations for the incineration of municipal waste to monitor and report their emissions under the EU ETS as from 2024. The amendments concerning installations and aviation apply since 1 January 2024, while the rules for ETS2 entered into force in July 2024.

The second revision of the Monitoring and Reporting Regulation was adopted on 29 August 2024[108]. It introduces monitoring and reporting requirements for non-CO_2 aviation effects per flight and on how to zero-rate emissions from the combustion of renewable fuels of non-biological origin (RFNBOs), recycled carbon fuels (RCFs) and synthetic low carbon fuels under the ETS. Demonstration of compliance with sustainability and emission savings criteria is a key condition for the zero-rating of emissions. The revised Regulation also improves upon the existing rules, including those on the monitoring and reporting on the transfer of CO_2 by means other than pipelines and on CO_2 considered to be permanently chemically bound in a product.

Amendments have also been made to regulate how the use of a recently established EU-wide database for biofuels[109] can be a way to demonstrate compliance with the sustainability and emission saving criteria. Additional detailed monitoring and reporting requirements have been introduced to cover the use of alternative aviation fuels, the harmonisation of small emitter thresholds and the treatment of biomass/RFNBOs/RCF in aviation. The second revision of the Monitoring and Reporting Regulation also advances the implementation of the ETS2, addressing amendments outstanding from the first revision, to promote further harmonization, to reduce the administrative burden for operators and national authorities and to improve the system's overall efficiency.

The Maritime MRV Regulation was revised in 2023[110] to prepare for the extension of the EU ETS to maritime transport, notably to include non-CO_2 emissions and detailed rules for determining emissions of companies falling within the scope of the EU ETS.

11.2. Verification and Accreditation

Verifiers of emission reports under the EU ETS must be accredited by a national accreditation body in line with the Accreditation and Verification Regulation and ISO 14065 (an international ISO standard). Accredited verifiers can operate with mutual recognition

[107] Commission Implementing Regulation (EU) 2023/2122 of 17 October 2023 amending Implementing Regulation (EU) 2018/2066 as regards updating the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council (OJ L, 2023/2122, 18.10.2023)

[108] Implementing Regulation 2018/2066 - see footnote 7.

[109] See Union Database for Biofuels for further information.

[110] Regulation 2015/757 - see footnote 98.

across all EU ETS countries, taking full advantage of the single market. This also ensures sufficient service availability across the EU. A detailed overview of accreditation and verification aspects in 2023 is included in Table F in Section IV of the accompanying staff working document.

In 2023, there were 105 accredited verifiers for installations and 20 for aircraft operators. In addition, 28 countries reported that at least one foreign verifier was active in their territory in 2023, and 6 countries reported having only foreign verifiers. This shows that the mutual recognition of verifiers among countries continues to work successfully.

Verifiers' compliance with the Accreditation and Reporting Regulation is found to be high. For 2023, no verifier suspensions or withdrawal of a verifier's accreditation were reported. In 2 cases, verifiers' scope of accreditation was reduced (Finland and Poland). By comparison, 3 suspensions, 1 withdrawal of accreditation and 1 scope reduction were reported for 2022.

In parallel to the revision of the Monitoring and Reporting Regulation, the Accreditation and Verification Regulation was revised. The revision was adopted on 13 May 2024, ahead of the submission deadline for verified baseline data reports by 30 May 2024. The objective of this amendment was:

- For free allocation to industry installations: to specify the verifier's role in checking the implementation of energy efficiency recommendations as one of the conditions for free allocation of allowances and in checking whether any derogations to this conditionality apply under Article 22a of the Free Allocation Regulation.

- For ETS2: to extend the application of the Regulation to the verification for ETS2 (e.g. introduction of new accreditation scope for ETS2, specific rules on when to waive site visits, the verifier's role in checking double counting between the two systems).

- Align the Accreditation and Verification Regulation with the revised Monitoring and Reporting Regulation for the aviation sector: to provide clarity on the verifier's role in assessing compliance with Articles 54 and 54a of the Monitoring and Reporting Regulation, which include specific requirements on how to attribute sustainable aviation fuels and their emissions to flights.

- To improve existing requirements in the Accreditation and Verification, for example by allowing verifiers to carry out virtual site visits for the aviation sector outside of the exceptional circumstances.

The second revision of the Accreditation and Verification Regulation is underway. It will cover the accreditation and verification requirements for the non-CO_2 aviation effects, the verifier's role in verifying the achievement of milestones and targets included in installations' climate neutrality plans and other changes introduced in the second revision of the Monitoring and Reporting Regulation.

11.3. Guidance documents

The Commission has developed guidance documents[111] for the monitoring, reporting, verification and accreditation. The aim is to provide detailed instructions, techniques and best practices to competent authorities, operators, verifiers and other stakeholders on the implementation of the EU ETS. This guidance plays a vital role in ensuring the integrity, transparency, harmonisation and accuracy of the emissions data within the EU ETS. As methodologies and technologies evolve, applying best practices and new techniques helps reduce errors and supports the system's overall effectiveness in reducing GHG emissions. These documents will be updated to reflect the revisions of the Monitoring and Reporting Regulation and the Accreditation and Verification Regulation. Priority will be given to the general guidance documents for installations, for aircraft operators, as well as the guidance on biomass and renewable fuel issues.

11.4. National competent authorities

How national competent authorities organise themselves to implement the EU ETS differs between countries. In some countries, multiple local authorities are involved, while in others implementation is more centralised. Countries choose these approaches based on cost- and time-effectiveness. An overview of the coordination between competent authorities implementing the EU ETS is presented in Table G in Section IV of the accompanying staff working document.

All countries reported having at least one central competent authority involved in implementing the EU ETS in 2023. In 14 countries, only a single, central competent authority was responsible for all EU ETS activities. Where multiple competent authorities are managing EU ETS activities, countries reported using one or more different solutions and tools to coordinate the work between those authorities. These solutions and tools include a central competent authority being responsible for the monitoring, reporting, accreditation and verification work (12 countries), playing a coordinating role[112] (10 countries), a central competent authority issuing binding instructions and guidance to local authorities (5 countries), providing joint training for competent authorities (8 countries) and convening regular working groups or meetings between authorities (13 countries).

In 2023, 16 countries did not charge administrative fees to installation operators for the permitting and approval of monitoring plans (the same as in 2022). Aircraft operators in 17 countries also did not have to pay any fees (the same as in 2022). Charges varied significantly by country and type of service – from about EUR 19 to EUR 8 442 for a permit and approval of a monitoring plan for installations, and from about EUR 2 to EUR 4 100 for aircraft operators. Except for Czechia, countries reported also charging administrative fees of different amounts for significant changes to monitoring plans. An overview of administrative

[111] Monitoring, reporting and verification of EU ETS emissions, DG Climate Action, 31.8.2024

[112] Where regional/local authorities are responsible for MRV work, the central competent authority also reviews relevant documents (such as monitoring plans) to monitor the quality of MRV processes.

charges in the EU ETS is presented in Table H in Section IV of the accompanying staff working document.

11.5. Compliance with the EU ETS

Compliance with the EU ETS is checked in annual cycles. For every year of operation, an operator must submit an annual emissions report by 31 March the following year. Once a verified report is checked by a competent authority, an operator must surrender the number of allowances equivalent to its verified emissions by 30 September the same year[113].

For each tonne of CO_2 emitted for which no allowance was surrendered on time, the ETS Directive imposes a penalty of EUR 100[114]. This is on top of the cost of surrendering allowances due. Other penalties may also apply to infringements of the EU ETS legislation.

A detailed overview of compliance with the EU ETS is presented in Tables I-K in Section IV of the accompanying staff working document.

In the 2023 compliance cycle, the level of compliance with the EU ETS remained very high. In most years, operators responsible for over 9% of emissions from installations and aviation met their legal obligations on time. The efficiency of the compliance system has improved, with a broader uptake of electronic reporting. In 2023, 12 countries used automated IT systems and electronic templates for monitoring plans, emission reports, verification reports and/or improvement reports. Nine countries also used automated IT systems to manage the workflow for monitoring methodology plans, annual activity level reports and other information exchanges on allocation data.

Due to exceptional circumstances, 9 countries (6 in 2022) allowed verifiers to carry out virtual site visits[115]. For 7 installations and 11 aircraft operators, virtual site visits were approved by the relevant competent authority.

Compliance checks on installations' annual emissions reports vary between competent authorities. In 2023, all competent authorities checked the completeness of the reports from installations, and most did so for reports from aircraft operators. The exceptions were the competent authorities in Greece and Latvia (with 10 and 2 aircraft operators, respectively), as well as Liechtenstein and Northern Ireland because these two countries do not administer any aircraft operators.

Competent authorities in 10 countries made conservative estimates for 47 installations (approximately 0.6% of all installations, down from 0.7% in 2022). Out of 4.2 Mt CO_2eq

[113] In the 2023 revision of the ETS Directive, the deadline to surrender allowances has been moved from 30 April to 30 September (applicable from 2024 onward).

[114] The penalty is indexed for inflation.

[115] Article 34a of the Accreditation and Verification Regulation allows the verifier to carry out a virtual site visit if a force majeure situation prevents the verifier from going to the site. This is only allowed subject to the competent authority's approval and if certain conditions have been met.

reported by the 47 installations, 2.1 Mt were estimated conservatively (compared to 1.0 Mt out of 2.4 Mt in 2022 CO_2eq reported by 61 installations).

Conservative estimates were made when the annual emissions reports were not submitted in time, when a negative verification opinion was issued, or when an emissions report did not comply with the Monitoring and Reporting Regulation[116]. For 15 installations, all emissions were estimated conservatively. For 10 installations, a conservative estimation covered only part of emissions. 17 installations were estimated to have generated no emissions and for the remaining 5 installations, the conservative estimation process was still ongoing at the time this report was being finalised.

Conservative estimates for aviation were reported by 3 countries[117] (5 in 2022) concerning 22 aircraft operators (33 in 2022) and 0.06 Mt CO_2eq (0.31 Mt CO_2eq in 2022).

Checks by competent authorities remain important to supplement verifiers' work. In addition to checking emissions reports, 19 countries reported that they had carried out on-site inspections at installations (one more than in 2022). Three countries[118] reported on-site inspections for aviation (the same as in 2022).

In 2023, 38 installations in 10 countries[119] were fined for not surrendering sufficient emission allowances to cover their reported emissions (excess emissions). For aviation, excess emissions penalties were reported by 4 countries for 9 aircraft operators. 14 countries[120] reported 75 infringements, which resulted in penalties, formal warnings or formal notices, including some but not all excess emissions cases. A total of 43 fines were reported (either issued or to be issued for example due to ongoing legal proceedings), amounting to EUR 88.8 million. This included aviation, with 9 infringements in 4 countries, leading to 7 fines, for a total of EUR 0.6 million. Most of the fines come from excess emissions penalties.

The most common infringements reported for 2023 were a failure to submit an emissions report (23 cases) or an activity level report (18 cases) in due time, a failure to notify changes or update the monitoring plan (7 cases) and operating without an emissions permit (7 cases).

[116] Article 70 of the Monitoring and Reporting Regulation

[117] Data reported by Italy for 2022 used as proxy - see page 38 of this report.

[118] A further two countries (Liechtenstein and Northern Ireland) do not administer any aircraft operators.

[119] Data reported by Italy for 2022 used as proxy - see page 38 of this report.

[120] The 14 countries are Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Spain and Sweden. For Italy, data reported for 2022 was used as proxy. Data reported by Italy for 2022 used as proxy - see page 38 of this report.

12. EU ETS in the context of the EU's climate and energy governance

The EU ETS operates within the broader context of the EU's climate and energy governance, including the Energy Efficiency Directive (Directive 2023/1791)[121], which has been recast as part of the 'Fit for 55' package of reforms. The aim of the Directive is to achieve energy savings by laying down targets and obligations for Member States and companies. The carbon price signal of the EU ETS is a consideration in the choice of policy measures and actions to that end. Article 35(1) of the Energy Efficiency Directive requires that the Commission's annual report on the functioning of the European carbon market (this report) takes into consideration the implementation of that Directive.

The revised Energy Efficiency Directive introduces new rules to reduce final energy consumption at EU level by 11.7% by 2030, compared to the projections of the 2020 EU reference scenario. All Member States are required to contribute to achieving this target. To this end, they set out indicative national contributions and trajectories in their updated integrated national energy and climate plans (NECPs) under the Governance Regulation. Member States submitted their draft updated NECPs in 2023 and the final plans were due by 30 June 2024.

The carbon price signal of the EU ETS feeds into the appraisal of energy efficiency-related investments and measures in the sectors covered. Member States also use auction revenue from the EU ETS to fund energy efficiency improvements. In 2023, 20 Member States reported spending EUR 2.3 billion to fund projects related to energy efficiency. Those included investments in the thermal modernisation of public and private buildings, energy efficiency advice, efficient public lighting, efficient heating and cooling systems including district heating, as well as research and development, all with the objective to reduce energy consumption.

13. Link between the EU ETS and the Swiss ETS

Since 2020, the EU ETS and the Swiss ETS have been linked through an international agreement between the EU and the Swiss Confederation. This means that allowances issued in one system can be surrendered for emissions generated in either of the two systems. With access to a larger market, operators can make cost-efficiency gains and have more options for emissions abatement. The Linking Agreement[122] sets out the conditions and requirements under which the two systems are linked. It also establishes a mechanism to ensure that the linking conditions of Article 25 of the ETS Directive are respected.

Including aviation in the Linking Agreement was a crucial requirement for the EU. Under Article 6 of the Agreement, Switzerland applies the same approach to the rules on coverage,

[121] Directive (EU) 2023/1791 of the European Parliament and of the Council of 13 September 2023 on energy efficiency and amending Regulation (EU) 2023/955 (recast) (OJ L 231, 20.9.2018)

[122] Agreement between the European Union and the Swiss Confederation on the linking of their greenhouse gas emissions trading systems (OJ L 322, 7.12.2017).

cap and allocation as the EU ETS. In line with Article 7 of the Linking Agreement, this will continue under the revised ETS Directive.

Swiss domestic flights and flights departing to EEA airports are covered by the Swiss ETS, while flights departing from the EEA to Switzerland fall under the EU ETS. This arrangement increases the environmental integrity of both systems. Both the EU ETS and the Swiss ETS have applied the same approach for incoming and outgoing flights from and to the UK since Brexit. Following the revision of the EU ETS Directive in 2023, the scope of both systems has been extended to cover the flights to/from the EU's outermost regions.

Tables L-M in Section V of the accompanying staff working document show key figures for both systems in 2023 – auctioned allowances, free allocation and verified emissions for installations and aircraft operators. When compared, they demonstrate that the compatibility of the two systems is not a matter of size but of qualitative requirements, level playing field conditions and measures to safeguard market integrity.

In line with the Linking Agreement, a direct link has been created between both systems' registries to allow transfers of allowances between the two systems. It allows market participants to execute the transactions between the two systems as if they were in one market, thus improving liquidity in the linked market. Transfers between systems (registries) are performed daily, Monday to Friday, except for specific dates tied to bank holidays.

Table 9 and Table 10 present the effects of the link between the EU ETS and the Swiss ETS in 2023. They show to what extent regulated entities in both systems used allowances issued in the other system for compliance.

In total, regulated entities in the EU ETS (both installations and aircraft operators) used 1 140 848 allowances issued under the Swiss ETS for compliance in 2023. This is nearly 170 000 allowances more than in 2022 and almost 550 000 allowances more than in 2021, marking an increased use of the flexibility provided by the link between the EU ETS and the Swiss ETS and a consistently growing awareness and acceptance of the link.

While installations in the EU ETS used fewer aviation allowances issued under the Swiss ETS than in the previous year (around 100 000 in 2023 compared to 180 000 in 2022), this was partly compensated by an increased in the use of the Swiss ETS general allowances (around 425 000 in 2023 compared to 395 000 in 2022).

The number of the Swiss ETS general allowances used for compliance by EU aircraft operators in 2023 increased slightly to around 50 000 (compared to 40 000 in 2022). More impressively, the number of the Swiss ETS aviation allowances used for compliance by aircraft operators in the EU ETS increased significantly from around 355 000 in 2022 to 560 000 in 2023. In relative terms, allowances issued under the Swiss ETS accounted for around 0.10% of the total allowances surrendered in the EU ETS in 2023. However, they accounted for a bigger share of 21.64% of all the Swiss ETS allowances allocated for free and auctioned that year.

In the Swiss ETS, installations used a higher share of the EU ETS general allowances for compliance in 2023 (11.6%) compared to 2022 (6.2%). In both years, installations in the Swiss ETS did not use the EU ETS aviation allowances for compliance.

Table 11 aggregates the volume of allowances (both general and aviation) transferred on behalf of market participants between the EU ETS and the Swiss ETS since 2020. So far, 2023 saw the highest number of aggregate total transfers. The current historical balance shows an outflow of 1 268 426 allowances from the EU ETS to the Swiss ETS. It should, however, be noted that the figures may include re-transfers of the same allowances.

Table 6. Units used for compliance in the EU Registry in 2023. Data extracted from the EU Registry on 1 October 2024.

Installations	**Free allocation and auctioning**	**Verified emissions**	**Surrendered units**	**EU ETS allowances**		**Swiss ETS allowances**	
				General	*Aviation*	*General*	*Aviation*
	1 055 030 682	1 096 788 327	1 099 802 112	1 095 206 929	4 068 223	425 611	101 349
	% of the total			99.58	0.37	0.04	0.01
Aircraft operators	**Free allocation (including Swiss ETS) and auctioning**	**Verified emissions (including under the Swiss ETS)**	**Surrendered units**	**EU ETS allowances**		**Swiss ETS allowances**	
				General	*Aviation*	*General*	*Aviation*
	28 261 053	54 128 536	54 186 768	34 756 873	18 816 007	51 865	562 023
	% of the total			64.14	34.72	0.10	1.04

Table 10. Units used for compliance in the Swiss Registry in 2023. Aircraft operators refer to those administered by Switzerland.

Installations	**Free allocation and auctioning**	**Verified emissions**	**Surrendered units**	**EU ETS allowances**		**Swiss ETS allowances**	
				General	*Aviation*	*General*	*Aviation*
	4 177 117	3 912 485	3 904 451	452 906	0	3 419 042	32 503
	% of the total			11.60	-	87.57	0.83
Aircraft operators	**Free allocation (including EU ETS) and auctioning**	**Verified emissions (including under the EU ETS)**	**Surrendered units**	**EU ETS allowances**		**Swiss ETS allowances**	
				General	*Aviation*	*General*	*Aviation*
	1 095 995	1 632 015	1 630 901	118 408	714 629	17 747	780 117
	% of the total			7.26	43.82	1.09	47.83

Table 11. Transfers of allowances between the EU ETS and the Swiss ETS (2020 -2023).

Year	2020	2021	2022	2023	Total
Transfer from the EU ETS to the Swiss ETS	475 679	1 051 360	1 714 499	2 603 612	5 845 150
Transfer from the Swiss ETS to the EU ETS	0	1 523 770	1 215 662	1 837 292	4 576 724
Balance	**1 268 426**				

14. Summary

The EU ETS in 2023 was marked by a historical reduction in emissions from installations driven by the power sector, where renewable electricity production (primarily wind and solar) increased substantially, and the trend of gas replacing coal in power generation was resumed. With this development, ETS emissions from installations are around 47.6% below 2005 levels and well on track to achieve the 2030 target of -62%.

Farther reaching emission reductions in the EU ETS in 2023 have been facilitated by a sustained robust carbon price signal. In ESMA's assessment, the EU carbon market remained stable in 2023 and continued to operate in line with market fundamentals. Also, most of the recommendations issued by ESMA in 2022 to enhance the transparency of the carbon market are now considered implemented.

Emission developments confirm the effectiveness and efficiency of the EU ETS as one of the main policy incentives for the decarbonisation of the European economy. The EU ETS revenue also remains an important source of funding for this transformation, with EUR 43.6 billion raised in 2023 and distributed primarily to national budgets, but also the ETS Innovation Fund and the ETS Modernisation Fund, as well as the RRF for the REPowerEU plan. The total revenue raised by the EU ETS to date exceeds EUR 200 billion.

Further effort is needed both to reduce emissions and to transform the EU's economy in line with European Climate Law targets and European Green Deal objectives. The EU ETS was revised in 2023 to support this effort. The cap on emissions has been tightened, while the scope of the system has been expanded to the EU's fair share of CO_2 emissions from maritime transport. The system has also been strengthened for aviation. A new system, ETS2, has been created to help advance emission reductions from buildings, road transport and additional sectors. The revision is fully in force, and the Commission and Member States continue to work on its implementation.