EUROPEAN
COMMISSION

Brussels, 3.12.2025
COM(2025) 735 final

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

on the functioning of the European carbon market in 2024

{SWD(2025) 388 final}

Table of Contents

1. Introduction 3
2. State of play of the EU ETS 4
2.1. Scope and coverage 4
2.2. ETS2 - the new emissions trading system for buildings, road transport and additional sectors 5
2.3. Social Climate Fund 5
2.3.1. Social climate plans 6
3. Cap on emissions 7
4. Auctioning of allowances 10
4.1. Auctioning and cancellation of allowances due to maritime scope expansion of the EU ETS 11
4.2. Effort Sharing Regulation flexibility 12
4.3. Voluntary cancellation of allowances 12
5. Free allocation of allowances 13
5.1. Carbon Border Adjustment Mechanism 15
6. EU carbon market 16
6.1. Balancing supply and demand 16
6.2. Market oversight 17
7. Emission trends 20
7.1. Emissions from fossil fuel combustion in installations 21
8. Revenues from the EU ETS 22
8.1. Aid for indirect costs 26
8.2. ETS Innovation Fund 28
8.3. ETS Modernisation Fund 30
8.4. ETS Decarbonisation Fund for Greece 31
9. Aviation 32
10. Maritime transport 35
11. EU ETS implementation framework 36
11.1. Monitoring and reporting of emissions 36
11.1.1. Monitoring and reporting of emissions from municipal waste incineration 37
11.1.2. Monitoring and reporting of non-CO2 aviation effects 37
11.2. Verification and accreditation 38
11.3. Guidance documents 39
11.4. National competent authorities 39
11.5. Compliance with the EU ETS 40
11.6. Implementation framework for maritime transport 41
11.6.1. Monitoring and reporting of emissions 42

11.6.2. Verification and accreditation 42
11.6.3. Administering authorities 43
11.6.4. Compliance with the EU ETS for maritime transport 43
11.6.5. Implementation of ETS2 43
12. EU ETS in the context of the EU's climate and energy governance 43
13. Link between the EU ETS and the Swiss ETS 44
14. Summary 48

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. In line with the 'polluter pays' principle, it puts a cap and a price on emissions from the energy, industry and maritime transport sectors and part of the aviation sector in Europe. Emissions covered by the EU ETS account for approximately 40% of the EU's total emissions.

The cap ensures that emissions decrease over time, and the carbon price, determined by the market, provides an incentive for companies to deploy solutions and make investments to reduce emissions - where it costs least to do so and in a technologically neutral way. The carbon price also determines the revenue that the EU ETS generates.

Since its launch in 2005, the EU ETS has helped drive down emissions from electricity and heat generation and industrial production by 50%[1] and is on track to achieve its 2030 target of 62% reduction (compared to 2005). To date, the system has generated some EUR 248 billion in auction revenue, distributed primarily to national budgets to be used for climate action and energy transformation.

This report takes stock of the functioning of the EU ETS in 2024, considering also relevant developments in the first half of 2025. It provides an updated overview of key aspects of the system's framework and highlights annual developments.

Most importantly, the report recalls EU ETS trends in emissions and auction revenue. In 2024, emissions from power and industry installations under the EU ETS continued to decrease, falling 5.8% from 2023 levels. In aviation, intra-European emissions rose 15% compared to 2023, partly due to the broadening of the geographical scope (re-inclusion of non-domestic flights involving outermost regions). At the same time, 2024 marked the first year that emissions from maritime transport were included under the EU ETS.

The total revenue generated by the EU ETS in 2024 amounted to EUR 38.8 billion. This 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]. The report describes how Member States used their ETS revenue in 2024 and summarises developments under the Innovation and Modernisation Funds.

The report sets out the adjustments to the EU ETS cap that will take effect in 2026 due the planned rebasing, expansion of the scope to cover emissions of more greenhouse gases (GHG) for maritime transport and an updated list of small emitters excluded from the system.

The report is adopted in line with Articles 10(5) and 21(2) of the ETS Directive (Directive 2003/87/EC)[3]. It is based mostly on data from the Union Registry and national reporting. The report is

[1] ETS emissions from installations in the power and industry sectors in 2024, 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 31 August 2025.

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

[3] Directive 2003/87/EC of 13 October 2003, OJ L 275, 25.10.2003, p. 32.

accompanied by a staff working document (Technical information). The report was drafted prior to the meeting of the Council of the European Union (Environment) on 4-5 November 2025.

2. State of play of 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[4]. Since January 2020, the EU ETS has been linked with Switzerland's emissions trading system (Swiss ETS).

As of 2024, the sectoral scope of the EU ETS covers GHG emissions from over 12.000 entities from:

- electricity and heat generation plants and manufacturing installations in Europe;
- aircraft operators flying between airports in the European Economic Area (EEA) and from the EEA to Switzerland and to the United Kingdom;
- maritime transport occurring between two EEA ports and when ships are in EEA ports, as well as half of emissions from voyages to or from EEA ports that start or end outside the EEA.

In addition to CO_2 emissions, the EU ETS covers emissions of other GHGs from electricity and heat generation plants and manufacturing installations. These include:

- N_2O (nitrous oxide) from nitric, adipic and glyoxylic acids and glyoxal production;
- PFCs (perfluorocarbons) from primary aluminium production.

CH_4 (methane) and N_2O (nitrous oxide) emissions from maritime transport activities are covered from January 2026.

In 2024, 23 countries reported permits for ETS activities releasing emissions other than CO_2. Four countries declared having included carbon capture and storage activities in installation permits[5].

From 2024, installations for the incineration of municipal waste monitor and report their emissions under the EU ETS. They are not, however, required to surrender allowances for their emissions. Emissions from waste treatment are subject to national reduction targets under the Effort Sharing Regulation (Regulation 2018/842)[6].

Information about installations, aircraft operators and shipping companies, as well as GHGs reported in the scope of the EU ETS (as it stood in 2024) can be found in Section 1 of the accompanying staff working document.

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

[5] These countries were Italy, the Netherlands, Norway and Sweden.

[6] Regulation (EU) 2018/842 of 30 May 2018, 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 emissions trading system (ETS2) was created to cover CO_2 emissions from fuel combustion in buildings, road transport and additional sectors (mainly small industry not covered by the existing EU ETS).

ETS2 is separate from the existing EU ETS. Although both are 'cap and trade' systems, ETS2 covers emissions upstream. This means that fuel suppliers (regulated entities) are required to monitor and report emissions corresponding to the combustion of fuels that they release for consumption in the sectors that fall under the scope of ETS2, and to buy and surrender the allowances corresponding to these emissions. From January 2025, the regulated entities falling under ETS2 are required to hold a GHG emissions permit and an approved monitoring plan for the monitoring and reporting of their annual emissions.

Annual reporting of verified emissions will be mandatory for emissions released from 2025, with reports due by 30 April the following year, so emissions for 2025 are to be reported in 2026. Regulated entities will have to surrender the number of allowances corresponding to their emissions by 31 May in the year of reporting. This obligation may be postponed for one year in the event of exceptionally high gas or oil prices in the first half of 2026. See Chapter 11 for the ETS2 implementation framework and supporting documents.

In December 2024, the Commission published the EU-wide quantity of allowances for ETS2 in 2027. This cap is set at 1 036 288 784 allowances for 2027, for the EU-27 and the three EEA-EFTA states. The ETS2 cap for 2027 was calculated based on the average CO_2 emissions from fuel combustion in the ETS2 activities from 2016 to 2018. In line with the ETS Directive, that average is reduced up to the year 2027 through the following: (i) until 2024, a linear reduction trajectory consistent with the one for all emissions within the scope of the Effort Sharing Regulation and (ii) for the years 2025-2027, an annual linear reduction factor of 5.1%.

The ETS2 cap applicable from 2028 will be determined by June 2027, based on the average CO_2 emissions reported by the ETS2 regulated entities for the years 2024 to 2026. Member States can choose to unilaterally include in ETS2 CO_2 emissions from activities that are not included in the scope of the ETS Directive, subject to approval by the European Commission. To date, the Commission has approved the opt-in of additional activities by Austria, Finland, the Netherlands and Sweden. The ETS2 cap for 2027 will be amended to reflect the additional emissions from national opt-ins.

The ETS2 complements national emission reduction targets under the ESR. Member States must implement complementary policies in ETS2 sectors not only to achieve their targets, but also to keep ETS2 prices in check. In September 2025, the Commission published an overview of effective policies and measures that can help bring down emissions in road transport and building sectors[7].

2.3. Social Climate Fund

The Social Climate Fund (SCF) was created alongside ETS2 to provide Member States with funding to address the social impacts arising from the inclusion of the buildings and road transport sectors in the

[7] New study provides toolbox for early decarbonisation in ETS2 sectors, DG Climate Action, 9.9.2025.

new system and to support the most vulnerable groups, particularly households in energy or transport poverty.

The Fund will make EUR 65 billion (in current prices) available over the period 2026-2032, financed via externally assigned revenue generated primarily from auctioning ETS2 allowances as well as from auctioning 50 million allowances from the existing EU ETS (started already in 2025). Each Member State's financial allocation of the Fund has been established based on emissions, population profile and energy and transport poverty and relative prosperity indicators. Member States should have submitted national Social Climate Plans to the Commission for approval by 30 June 2025, setting out how they intend to spend their SCF resources. Including a mandatory minimum 25% contribution by Member States to their plans, the SCF will mobilise at least EUR 86.7 billion.

2.3.1. Social climate plans

The social climate plans should include an analysis of the likely effects of ETS2 on vulnerable groups, as well as structural measures and investments to mitigate those effects, targeting the identified vulnerable groups. The measures and investments could cover improving energy efficiency and renovating buildings, developing clean heating and cooling and integrating renewable energy, as well as deploying zero-emission and, in duly justified cases, low-emission mobility solutions, including public transport.

All measures and investments must respect the 'do no significant harm' (DNSH) principle regarding the six environmental objectives outlined in the Taxonomy Regulation (Regulation 2020/852). Member States also have the option of spending a limited part of their SCF allocation on temporary direct income support. Additionally, Member States must ensure policy coherence with their national energy and climate plans (NECPs), and the Social Climate Plans may include accompanying measures to reinforce coherence and strengthen incentives for clean alternatives.

Already in 2023, the Commission set up a dedicated expert group with Member States representatives to discuss and exchange best practice, which meets on a regular basis. The Commission has also published several thematic notes and guidance documents. Two notes on best practice for cost-effective measures and investments and appropriate public consultations were published in June 2024. In March 2025, two guidance documents were published on preparing the social climate plans and on applying the DNSH principle. The latest guidance document on the monitoring and implementation was published in October 2025[8]. In addition, the Commission has set up a platform for Member States to submit questions that arise on a rolling basis.

The Commission has directly supported 10 Member States in preparing their social climate plans through the Technical Support Instrument. The support covered an initial assessment of ETS2 impacts and vulnerable groups, stakeholder engagement, and short-listing and characterisation of relevant measures and investments.

In late 2024 and early 2025, the Member States launched mandatory stakeholder consultations on their social climate plans. The consultations will continue until the plans are officially submitted. In parallel, Commissioner Hoekstra chaired the first Implementation Dialogue on the implementation of ETS2 and

[8] Guidance on the implementation of the Social Climate Fund, DG Employment, Social Affairs and Inclusion, 9.10.2025.

the SCF in June 2025, convening a diverse group of stakeholders from sectors including heat pumps, automotive, building renovation, micromobility, fuel supply and civil society.

By mid-October 2025, two Member States had officially submitted their Plans to the Commission for assessment (Latvia and Sweden). The Commission also reviewed the draft SCPs of some 15 countries. The Commission is working closely with all Member States throughout the (pre-)submission and assessment process, strongly encouraging Member States to swiftly implement the SCF and roll out support for vulnerable groups.

The Commission has five months to assess the plans that have been formally submitted. It may provide observations or request additional information from the Member State concerned within two months of receiving them.

3. Cap on emissions

The EU ETS cap 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 gives companies in the ETS certainty about the expected scarcity of supply of allowances.

The cap is currently set to bring down EU ETS emissions by 62% by 2030, compared to 2005. From 2024 to 2027, the cap decreases annually at the rate of 4.3% of the reference emissions in Articles 3c and 9 of the ETS Directive[9]. From 2028, the annual reduction rate will be 4.4% per year.

Separate cap calculations apply to emissions in the scope of the EU ETS from electricity and heat generation, industrial production and maritime transport (as per Article 9 of the ETS Directive) and from aviation (as per Article 3c of the ETS Directive).

- In 2024, 1 386 051 745 allowances were issued for electricity and heat generation, industrial production and maritime transport[10], while 27 563 529 allowances were issued for aviation[11].

- In 2025, 1 298 127 514 allowances were issued for electricity and heat generation, industrial production and maritime transport, while 26 233 302 allowances were issued for aviation.

Under Article 9 of the ETS Directive, the 2026 cap is to be reduced by 27 million allowances (in line with the overarching 2030 emissions reduction target for the EU ETS).

At the same time, the cap is to be increased to reflect the expansion of the scope of the EU ETS to emissions of N_2O and CH_4 from maritime transport.

[9] In 2024 and 2025, the linear reduction factor for electricity and heat generation, industrial production and maritime transport amounted to 87 924 231 allowances and for aviation 1 330 226 allowances.

[10] For more details, see Commission Decision (EU) 2023/1575 of 27 July 2023, OJ L 192, 31.7.2023, p.30.

[11] For more details, see Commission Decision (EU) 2024/1797 of 27 June 2024 amending Decision (EU) 2023/2440, OJ L, 2024/1797, 28.6.2024. ELI: http://data.europa.eu/eli/dec/2024/1797/oj

Based on emissions for the most recent year for which data are available[12], this increase amounts to 2 375 680 allowances. These additional allowances will be auctioned and add to the Innovation Fund, entirely supplied by the EU ETS (see Chapter 8.2).

Furthermore, the list of installations excluded by certain Member States under Article 27 of the ETS Directive was updated for the period 2026-2030, resulting in small adjustments to the cap and the linear reduction factor as of 2026.

Altogether in 2026, 1 185 420 090 allowances will be issued for electricity and heat generation, industrial production and maritime transport, while 24 903 076 allowances will be issued for aviation[13].

Table 1 shows the total quantities of allowances issued for the different sectors under the EU ETS cap.

Table 1. EU ETS cap (2021-2026). 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. From 1 January 2024, the scope of the EU ETS for aviation 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 from 2024 reflects the extended scope of the EU ETS for aviation.

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
2025	1 298 127 514	26 233 302
2026	1 185 420 090	24 903 076

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

[12] Emissions data reported under Regulation (EU) 2015/757 for the reporting period 2024 on 1 October 2025.

[13] In 2026, the linear reduction factor for electricity and heat generation, industrial production and maritime transport amounted to 87 913 405 allowances and for aviation 1 330 226 allowances.

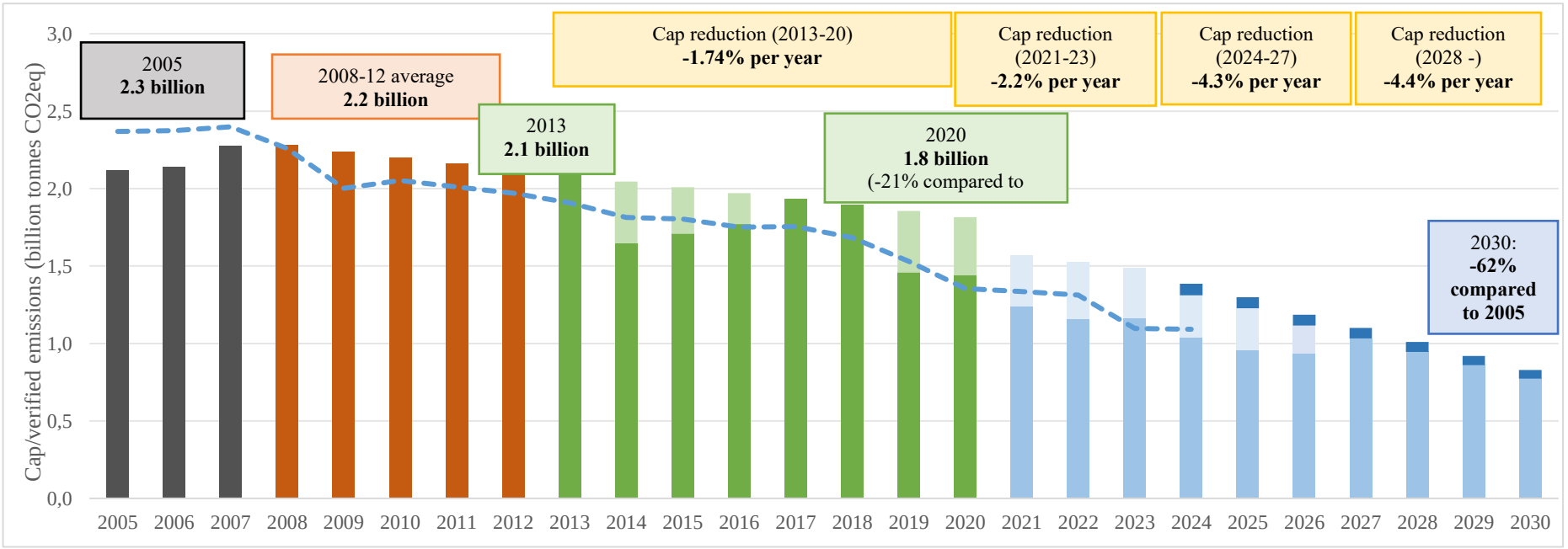


Figure 1. Emissions cap in the EU ETS compared with verified emissions. The figure considers the 2023 revision of the ETS Directive, i.e. rebasing of the cap in 2024 and 2026, including the maritime transport sector in the EU ETS from 2024 and the linear reduction factor of 4.3% in 2024-2027 and 4.4% 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.* ***From 2024, verified emissions in the figure also include the maritime sector, hence the 2024 and 2023 emissions are not comparable.*** *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[14]. The Auctioning Regulation (Regulation 2023/2830)[15] 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 2024, 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 (2021-2024).

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	592 801 500	6 688 500

In total, 221 auctions were held in 2024. No auctions were cancelled. From January 2025, allowances issued for the aviation sector are general allowances and no longer a separate allowance category.

Since July 2023, auction volumes have included allowances allocated to the Recovery and Resilience Facility (RRF) under the REPowerEU Regulation (Regulation 2023/435)[16]. Allowances auctioned under the REPowerEU Regulation will raise EUR 20 billion for the RRF by 31 August 2026. Member States will use these additional RRF resources to carry out further reforms and make investments to

[14] 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.

[15] Commission Delegated Regulation (EU) 2023/2830 of 17 October, OJ L, 2023/2830, 20.12.2023. ELI: http://data.europa.eu/eli/reg_del/2023/2830/oj

[16] Regulation (EU) 2023/435 of 27 February 2023, OJ L 63, 28.2.2023.

advance the clean energy transformation and boost energy security. By 30 June 2025, EUR 11.5 billion was raised for the RRF - REPowerEU with 164 710 000 allowances auctioned.

Figure 2 gives an overview of auction clearing prices in the EU carbon market in 2024 and the first half of 2025. The highest auction price in 2024 of EUR 75.35 was reached on 3 June. The lowest price of EUR 49.50 was recorded on 23 February. The average price in 2024 was EUR 64.74, down from EUR 83.60 in 2023. Auction prices were fairly range bound in 2024, with 182 out of 221 (82%) values between EUR 60 and EUR 75.

The auction platform regularly publishes detailed results of each auction on its website[17]. Further information on the performance of auctions, including the participation, cover ratios and prices, can be found in the ETS countries' auction reports[18].

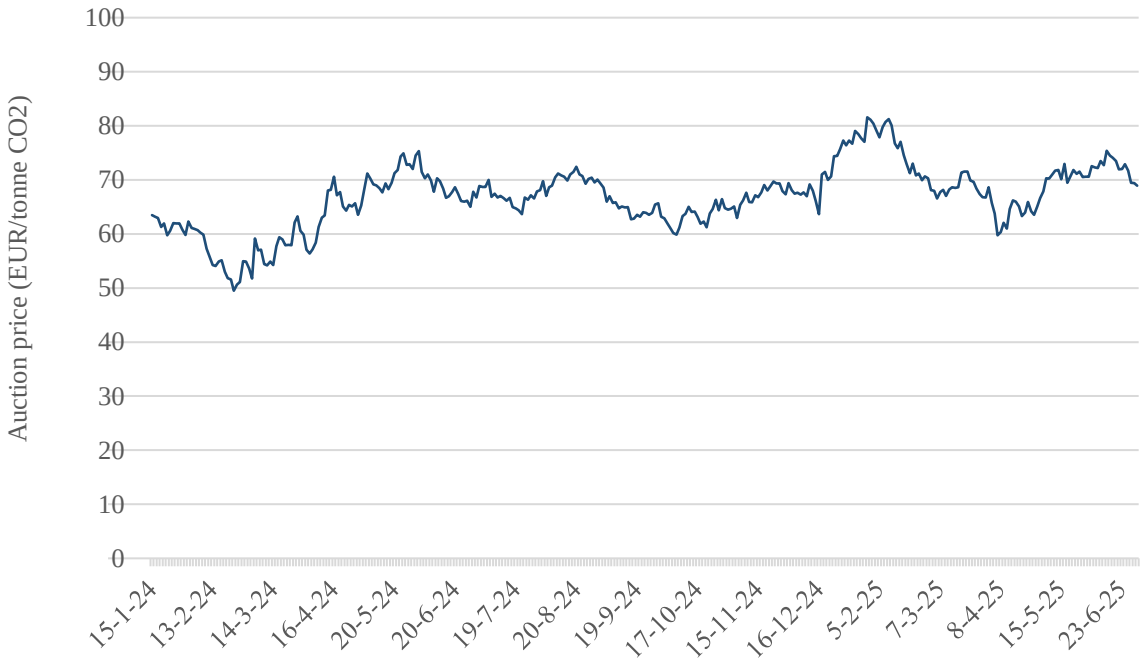


Figure 2. Clearing prices in auctions of general allowances (from 1 January 2024 to 30 June 2025) [EUR/tonne CO_2]

4.1. Auctioning and cancellation of allowances due to maritime scope expansion of the EU ETS

Maritime transport is included in the EU ETS with an initial phase-in period for 2024 and 2025, when shipping companies are obliged to surrender allowances only for a portion of their emissions (40% and 70% respectively). 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. Under Articles 3gb and 12(3-e) of the ETS Directive, the difference is to be cancelled from auctioning. The cancellation for 2024, totalling 54 243 768 allowances, will take place in 2026 through an amendment to the auction calendar.

[17] EU ETS auctions, EEX.

[18] Auction reports, DG Climate Action.

Article 9 of the ETS Directive provides that from January 2026, the quantity of allowances are to be increased to take into account the coverage of non-CO_2 greenhouse gas emissions from maritime transport. The allowances resulting from that increase are to be auctioned in 2026 and added to the Innovation Fund through an amendment to the auction calendar.

4.2. Effort Sharing Regulation flexibility

The Effort Sharing Regulation (ESR) establishes binding national emission reduction targets for Member States for the period 2021-2030. These targets cover sectors outside the existing EU ETS – domestic transport (excluding aviation), buildings, agriculture, waste and small industry.

The Regulation includes a one-off flexibility provision whereby nine Member States[19] have the possibility to cancel up to a maximum of 100 million EU ETS allowances collectively for compliance with their target, to be deducted from their respective auction volumes.

From 2021 to 2024, six[20] of these eight Member States used the 'ESR flexibility' and collectively deducted 28.8 million allowances from their auction volumes. Going forward, Sweden will start using the 'ESR flexibility' from 2025, while Denmark and Luxembourg will stop using the flexibility from 2026 onwards.

4.3. Voluntary cancellation of allowances

Under Article 12(4) of the ETS Directive, Member States are encouraged to cancel allowances if they close electricity generation capacity in their territory due to additional national measures. This way Member States may prevent the resulting decrease in emissions from being made up elsewhere in the system.

The Member State concerned must inform the Commission of its intended cancellation. The cancellation is carried out by reducing the total quantity of allowances to be auctioned by the Member State and the quantity is limited to a maximum of the sum of relevant verified emissions over the five years preceding the closure. The procedure for the cancellation of allowances is laid down in Article 25 of the Auctioning Regulation.

In December 2023, Germany notified the Commission of its intention to cancel allowances associated with the closure of two power plants in 2022 as part of the country's coal phase out policy[21]. The cancellations are planned to occur between 2025 and 2030. The number of allowances to be cancelled in relation to the notification may be communicated to the Commission annually.

The methodology to calculate the number of allowances to be cancelled was part of the notification. It takes into account emissions from replacement electricity generation in the electricity market as well as the operation of the Market Stability Reserve.

[19] The nine Member States are: Belgium, Denmark, Ireland, Luxembourg, Malta, The Netherlands, Austria, Finland and Sweden. The flexibility provision concerns Member States with targets under the Effort Sharing Regulation significantly above both the EU average and their cost-effective reduction potential, as well as Member States that did not allocate any free EU ETS allowances to industrial installations in 2013.

[20] The Netherlands and Sweden did not use the flexibility.

[21] Notification by Germany of voluntary cancellation for plants closed in 2022, DG Climate Action, 2.5.2024

In April 2025, Germany submitted to the Commission the number of allowances to be cancelled for the year 2023, from 1 September to 31 December 2025[22]. Based on the notified methodology, the number of allowances to be cancelled would depend on the surplus indicator of the Market Stability Reserve under the EU ETS (the total number of allowances in circulation, TNAC) in 2024[23].

The Commission published the 2024 TNAC on 28 May 2025 (see Chapter 6.1). It amounted to 1.15 billion allowances. Consequently, 514 000 allowances were cancelled from Germany's auction volume. This is already reflected in the revised 2025 auction calendars adopted on 28 July 2025.

5. Free allocation of allowances

Free allocation is a transitional measure primarily addressed to industry sectors. 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[24].

A dedicated carbon leakage list identifies sectors deemed to be at risk of carbon leakage, which are eligible to receive free allocation at 100% of the relevant benchmark levels. The list identifies 63 sectors and sub-sectors covering most of industrial emissions in the EU ETS. Less exposed sectors receive free allocation corresponding to a maximum 30% of the benchmark value.

Free allocation is based on performance benchmarks, which reflect an average emissions intensity per unit of product of the 10% most efficient installations in each sector. As allowances must be surrendered for all emissions, allowances must be bought on the market for emissions beyond those benchmark values. 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 2021-2025 allocation period[25]. The benchmarks will be updated for the 2026-2030 allocation period, a process that is ongoing at the time of writing. According to the revised ETS Directive, the annual reduction rates of the benchmarks have been 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 as of 2026. The applicable annual reduction rate will be determined specifically for each benchmark.

Since 2021, volumes of free allocation are being adjusted when significant changes in industrial production volumes occur based on a comparison between the initial volumes and an average of the preceding two years[26]. The threshold for adjustments is set at 15% increasing or decreasing production, and subsequent adjustments may take place between smaller 5% intervals. 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

[22] Notification by Germany of voluntary cancellation of allowances in the EU ETS for plants closed in 2023, DG Climate Action, 5.5.2024

23 If the 2024 TNAC was above 1 096 million, 514 000 allowances would be cancelled. If the 2024 TNAC was between 833 million and 1 096 million, no allowances would be cancelled.

[24] 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.

[25] Commission Implementing Regulation (EU) 2021/447 of 12 March 2021, OJ L 87, 15.3.2021.

[26] Commission Implementing Regulation (EU) 2019/1842 of 31 October 2019, OJ L 282, 4.11.2019.

submitted in 2021-2024 was over 3 900, around three times as many as the yearly average up to 2020. There is an increase in numbers from year to year due to the smaller 5% intervals required for subsequent changes to free allocation.

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 70/tCO_2, the value of this allocation would amount to about EUR 39 billion per year during this period. By mid-2025, the Commission had adopted 16 decisions to adjust free allocation due to changes in industrial production volumes, resulting in a net reduction of 173.7 million allowances[27]. In parallel, however, the Commission also adopted seven decisions correcting the initial level of free allocation, adding 2.3 million allowances[28]. This was necessary due to errors found in the data submitted by installations when applying for free allocation. Overall, the free allocation for 2021-2025 has been reduced by 171.5 million allowances 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 from phase 3 (2013-2020) and 200 million allowances from the Market Stability Reserve.

Table 3 summarises the annual levels of free allocation in the 2021-2025 allocation period (both initial and adjusted levels), showing reductions of 'Actual free allocation' for the years 2024 and 2025. The main reasons for these reduced volumes are the negative impacts on production levels for certain sectors because of the pandemic and the energy crisis primarily in 2022 and 2023. Because adjustments to free allocation are based on a comparison considering the average production levels over two years, the full effect of a continued decrease in production is delayed by two years.

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

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	545.7	542.4	537.0	499.7	494.8	**2 619.6**
Adjusted and corrected free allocation	-13.9	-16.5	-21.2	-57.8	-62.0	**-171.5**

Since 2013, the EU ETS has been built on the concept of an EU-wide, harmonised approach for a transitional system of free allocation of allowances based on benchmarks. This design, and the use of benchmarks, allows for situations where the free allocation received by individual installations can and is permitted to exceed the verified emissions for one or more years. However, the surplus of a few installations does not prevent overall emissions from decreasing and most installations would have a

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

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

carbon cost for obtaining the required amount of additional allowances to cover their emissions. The main reasons why a surplus of allowances could be received by an installation for free are explained below.

The benchmark values are set and regularly updated based on the average performance of the 10% most efficient (least emission intense) installations using that benchmark. This means that under each benchmark there would be a number of installations outperforming the other 90% that would receive enough allowances to cover their emissions or even a surplus of allowances. In addition, the Free Allocation Regulation includes provisions on the attribution of free allocation in the case of export and import of heat or waste gases, which may differ from how emissions are reported. Emissions and free allocation for such cases could be assigned to separate installations, with the result that one appears to receive more allowances than its emissions. For example, a chemical plant importing heat from another installation receives free allocation to mitigate carbon leakage risks while the emissions are reported by the heat producing plant.

Also relevant for a potential excess of allowances are the rules for annual allocation adjustments to reflect significant changes in industrial production volumes (see above) The two-year average creates a 'buffer', meaning that the full effect of a significant production decrease would not apply in full on free allocation levels until two years later, i.e. reported emissions would go down immediately but free allocation would not.

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 from phasing out ETS free allocation 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 accounted for approximately 54% of total free allocation in 2021-2025.

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 began in October 2023, during which importers report emissions but are not yet required to make payments. It continues until the end of 2025, when full implementation will gradually be phased in.

Importers of goods in CBAM sectors to the EU will need to buy and surrender certificates covering embedded emissions from 2026. To support industry in its decarbonisation efforts, the ETS Directive

[29] Regulation (EU) 2023/956 of 10 May 2023, OJ L 130, 16.5.2023.

directs proceeds from the auctioning of phased-out free allowances to the Innovation Fund (see Chapter 8.2), paying particular attention to projects in CBAM sectors.

The EU is also taking steps to simplify and strengthen CBAM for its definitive phase. In June 2025, the European Parliament and Council reached a provision political agreement on a proposal to simplify CBAM. This was adopted formally in September 2025[30]. One key aspect of the proposal is to increase the exemption threshold to allow up to 50 tonnes of imported goods per importer per year to be exempt from CBAM. This is expected to exempt 90% of companies while still covering 99% of emissions. At the time of writing, the Commission is also preparing several pieces of secondary legislation (delegated acts and implementing acts) to ensure timely and effective implementation of CBAM when the definitive phase begins in 2026.

The Commission is also preparing legislative proposals to extend the CBAM to certain downstream goods to prevent downstream carbon leakage[31] as well as to address the risk of circumvention[32] and to adjust the rules applicable to electricity imports.

At the same time, the Commission will publish a proposal to address the risk of carbon leakage related to exports of CBAM goods produced in the EU, as announced in the Communication on *Delivering the Clean Industrial Deal*.[33] As discussed in last year's Carbon Market Report, the phase-out of free allocation means that EU producers of CBAM goods will have to pay for their embedded carbon emissions, while carbon leakage is addressed by CBAM placing an equivalent carbon price on imported goods.

The Commission is also preparing a comprehensive review of CBAM for publication before the end of 2025, as provided in the CBAM Regulation. This review will assess the possibility of extending the scope of CBAM, the criteria used to identify CBAM goods, and the methodology for calculating indirect emissions. It will also assess the governance system, administrative costs, progress made in international climate action discussions, and the impact of CBAM on imports from developing countries, in particular least developed countries.

6. EU carbon market

6.1. Balancing supply and demand

The Market Stability Reserve (MSR) fosters carbon market balance and resilience by adjusting the supply of allowances to be auctioned in the EU ETS year on year. It is a rule-based instrument first introduced to address the structural imbalance between the supply of and demand for allowances on 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. In the short term, the MSR reacts to sudden supply-demand shocks, for example due to the economic downturn caused by the COVID-19 pandemic in 2020.

[30] Commission welcomes political agreement to simplify and strengthen the carbon border adjustment mechanism, DG Climate Action, 18.6.2025.

[31] Where carbon costs for basic CBAM materials may prompt manufacturers of downstream goods to move production abroad outside of the scope of the EU ETS.

[32] The CBAM Regulation defines circumvention as practices for which there is insufficient cause or economic justification, other than to effectively avoid, wholly or partially, the financial liabilities arising from CBAM.

[33] See COM (2025) 378 final, Delivering on the Clean Industrial Deal', 2.7.2025, p.4.

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 the publication and according to a specific key. On 28 May 2025, the Commission published the Communication on the TNAC for 2024[34].

The 2024 TNAC totalled 1.15 billion allowances – a slight increase compared to 2023. As a result, 276 million allowances (24% of the TNAC) are being withdrawn from auctions between September 2025 and August 2026.

At the start of each year, the MSR invalidates allowances in its holdings above a threshold of 400 million. On 1 January 2025, the MSR invalidated 271 million allowances, leaving 400 million in the Reserve. Since 2023, the MSR has invalidated a total of 3.2 billion allowances.

Figure 3 illustrates the trend in the surplus of allowances in the EU carbon market since 2013. National contributions to the MSR are presented in Section 2 of the accompanying staff working document.

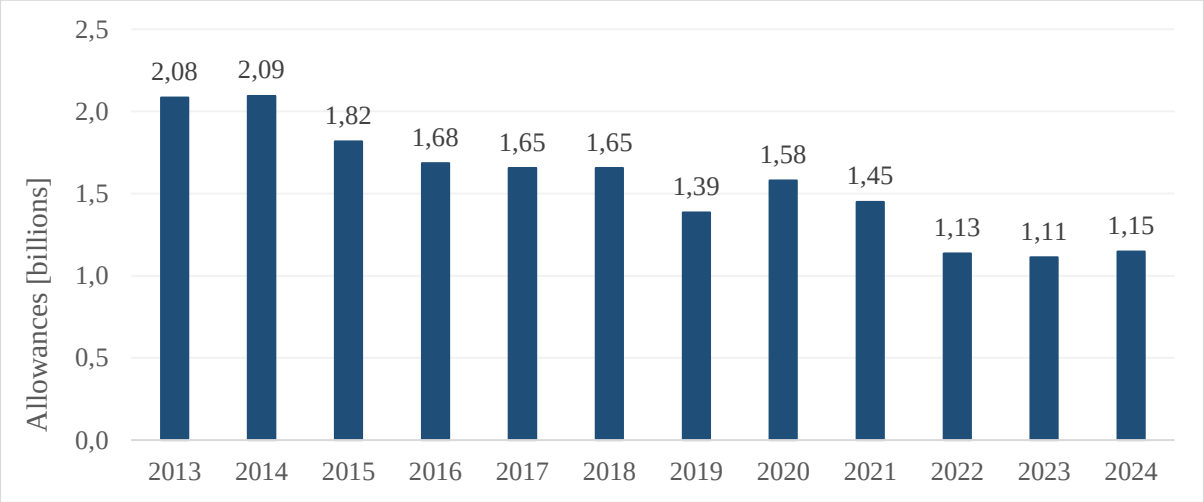


Figure 3. Surplus of allowances in the EU ETS (2013-2024).

6.2. 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

[34] Market Stability Reserve under the EU Emissions Trading System to reduce auction volume by 276 million allowances between September 2025 and August 2026, DG CLIMA, News article, 28.5.2025. Official journal of the EU: Communication from the Commission - Publication of the total number of allowances in circulation in 2024 for the purposes of the Market Stability Reserve under the EU Emissions Trading System (OJ C, C/2025/3180, 4.6.2024).

under MIFID II – the Directive on markets in financial instruments (Directive 2014/65/EU)[35]. 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[36], 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, other financial markets rules apply to the trading of emission allowances such as rules preventing market abuse and insider dealing (Regulation 596/2014)[37] which 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.

Following the 2023 revision of the ETS Directive, several amendments were implemented to further improve the transparency of the EU carbon market. ESMA was tasked with monitoring and regularly assessing the functioning of the EU ETS covering the primary market of auctions and trading on the secondary markets. In its first annual Report on the monitoring of EU carbon markets, published on 7 October 2024[38], and based on 2023 data, ESMA found no significant issues in the functioning of the market. ESMA identified decarbonisation of the power sector and industrial activity as key drivers for price developments in EU carbon markets.

In its most recent report[39], published on 22 October 2025 and based on 2024 market data, ESMA reconfirmed that carbon markets evolved in line with market expectations. The analysis reaffirms patterns and trends highlighted in the earlier report. The 2025 report demonstrates an initial gradual decline of ETS prices in 2024, followed by stabilisation driven by weak demand from the power sector, which continued to decarbonise, and by higher auction volumes. ESMA also reconfirmed the persistence of relative concentration of auctions, which is attributed to the operators' preference to source allowances via financial intermediaries.

ESMA observed that trading activity increased by 35% in 2024, reaching a total of 13.7 billion tonnes of CO_2eq exchanged across 4.7 million transactions. Market growth was primarily driven by on-venue trading, while off-exchange (over the counter) trading activity remained stable. Investment firms and credit institutions continue to play an important role both on- and off-exchange markets, accounting for 63% of total trading volumes.

ESMA outlined that central to the derivatives markets are futures contracts, which accounted for three-quarters of volumes traded in 2024. Overall, the secondary market contributes to the good function of the EU ETS by facilitating the acquisition of emission allowances by compliance entities from financial intermediaries.

ESMA also reiterated the importance of making legal entity identifiers (LEIs) available for entities in the Union Registry and calls for additional effort by national administrators to ensure the implementation of the LEI registration requirement for account holders in the Union Registry. This will

[35] Directive 2014/65/EU of 15 May 2014, OJ L 173, 12.6.2014. See consolidated version.

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

[37] 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.

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

[39] ESMA Market Report on EU Carbon Markets - 2025 (ESMA50-481369926-30552, 22.10.2025)

remain particularly relevant in 2025, as the number of account holders continues to increase due to the expansion of the EU ETS to the maritime sector and the launch of the ETS2 for building, road transport and other sectors. 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)[40] 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. Despite the obligation to review information on availability of LEIs, the availability of LEIs remains below expectations.

On 28 March 2024, the revised MIFID II[41], MIFIR – Regulation on markets in financial instruments (Regulation 2024/791)[42] 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 reports twice weekly[43], improving the transparency in trading in emission allowances and derivatives thereof.

As a follow-up to these new rules, the Commission is reviewing the regulatory framework for commodity derivatives markets, including emission allowances. The Commission is assessing whether position limits and management controls could contribute to preventing market abuse and promote orderly pricing and settlement conditions. Furthermore, the Commission is evaluating the criteria for defining ancillary activities at group level and exploring the possibility of centralizing and harmonizing transaction data collection across MIFIR and EMIR - European Market Infrastructure Regulation (Regulation 648/2012)[44], and assessing which data should be public and how best to disseminate it. As part of this work, the Commission conducted a targeted consultation[45] on the review of the functioning of commodity derivatives markets and certain aspects relating to spot energy markets, which also cover financial market rules applicable to emission allowances.

The findings of the targeted consultation on the commodity derivatives framework will feed into the work of the Gas Market Task Force (GMTF), set up in early 2025 as part of the action plan for affordable energy[46], to scrutinise the operation of EU gas markets and intervene when necessary and appropriated.

---

[40] Commission Delegated Regulation (EU) 2019/1122 of 12 March 2019 supplementing Directive 2003/87/EC, OJ L 177, 2.7.2019. See consolidated version.

[41] Directive (EU) 2024/790 of 28 February 2024 amending Directive 2014/65/EU, OJ L, 2024/790, 8.3.2024, ELI: http://data.europa.eu/eli/dir/2024/790/oj . See consolidated version.

[42] Regulation (EU) 2024/791 of 28 February 2024 amending Regulation (EU) No 600/2014, OJ L, 2024/791, 8.3.2024, ELI: http://data.europa.eu/eli/reg/2024/791/oj. See consolidated version.

[43] 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.

[44] Regulation (EU) No 648/2012 of 4 July 2012, OJ L 201, 27.7.2012. See consolidated version.

[45] Targeted Consultation Document - Review of the functioning of commodity derivatives markets and certain aspects relating to spot energy markets. 26.02.2025

[46] Action Plan for Affordable Energy Unlocking the true value of our Energy Union to secure affordable, efficient and clean energy for all Europeans, published 26 February 2025.

Given that the rules on energy derivative products broadly also apply to the trading of emissions allowances and associated derivative products, any findings of the task force, which is expected to finalise its work by the end of 2025, could be relevant for EU carbon markets.

7. Emission trends

In 2024, overall emissions in the EU ETS amounted to 1 187 million tonnes (Mt)[47]. This figure is higher than in 2023 (1 150.3 Mt CO_2eq) partly due to the inclusion of the maritime sector in the EU ETS. Considering only installations and aircraft operators, ETS emissions in 2024 were 4.4% below 2023 level.

Emissions from power and industry installations amounted to 1 033.3 Mt CO_2eq, representing a 5.8% decrease from 2023 levels. With this progress, ETS emissions from these installations are now around 50% below 2005 levels and on track to achieve the 2030 target of 62% reduction. Table 4 shows annual emissions data from installations. Aviation and maritime emissions are discussed in Chapters 9 and 10 respectively.

The primary contributors to the overall reduction in EU ETS emissions were the heat and power sectors. Emissions from electricity and heat generation dropped by 10.7% compared to 2023[48], largely due to a substantial increase in the share of renewables and nuclear in the electricity mix, coupled with a reduced reliance of major fossil fuels such as natural gas and coal (see Chapter 7.1). This trend emerged despite lower average carbon prices in 2024 (mostly within the EUR 60-75 range), and an overall increase in electricity production.

In 2024, renewables and biofuels were the leading source of electricity in the EU, capturing 47.2% of the share. Overall renewable electricity output increased by 7.6% in 2024, with solar power seeing a remarkable increase of 19.3% and hydropower growing 12%, although biofuel use declined by 5.2%[49].

Nuclear energy and fossil fuel combustion contributed 23.5% and 28.1% to electricity production, respectively. This includes an 11.9% decline in coal-based electricity, 8.1% drop in natural gas usage, a 5.2% rise in oil-based electricity, and a 5.1% increase in nuclear energy production.

In 2024, the EU experienced another record year for solar energy capacity installations, with 65.5 GW added, bringing the total to 338 GW, as reported by SolarPower Europe. Wind energy capacity reached 234 GW, with 12.9 GW being installed in the same year, according to WindEurope.

Emissions from industrial installations in 2024 decreased slightly, by 0.8% compared to 2023. Despite the overall reduction of output in industrial production[50], a modest recovery was observed in some energy-intensive sectors such as steel, fertilisers and chemicals. This suggests that these sectors are gradually ramping up activity after the energy crisis triggered by the surge in natural gas prices in 2022 due to Russia's invasion of Ukraine. The varying production output in different sectors can justify the

[47] Verified ETS emissions in 2024, Union Registry, data extracted on 1 October 2025.

[48] 2% of this decrease is also justified by data inconsistencies affecting the split between the power and the industrial emissions, not by market trends.

[49] Net electricity generation by type of fuel - monthly data, Eurostat.

[50] Industrial production down by 1.1% in the euro area and by 0.8% in the EU, Eurostat, 13.2.2025.

overall flat trend in emissions, even if small energy efficiency improvements were also observed in certain sectors in 2024.

Table 4. Verified emissions from installations in the EU ETS (2019-2024) [million tonnes CO_2eq]. Data extracted from the Union Registry on 1 October 2025.

Year	2019	2020	2021	2022	2023	2024
Verified emissions-installations	1 530	1 356 (1 253 UK excl.)	1 337	1 313	1 096	1 033
Change year-on-year	-9.1%	-11.4%	-1.4% (6.6% UK excl.)	-1.8%	-16.5%	-5.7%
Verified emissions-electricity and heat generation	822	696 (653 UK excl.)	708	725	552	493
Change year-on-year	-14.7%	-15.3%	1.6% (8.5% UK excl.)	2.4%	-23.9%	-10.7%
Verified emissions-industrial production	708	660 (601 UK excl.)	629	589	544	540
Change year-on-year	-1.6%	-6.9%	-4.7% (4.7% UK excl.)	-6.4%	-7.5%	-0.8%

7.1. Emissions from fossil fuel combustion in installations

Figures 4 and 5 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[51]. Not all emissions under the ETS originate from the combustion of fossil fuels. Some emissions originate directly from industrial processes. Figure 4 shows the share of emissions from fossil fuel combustion in installations' total emissions, and Figure 5 shows the breakdown of combustion emissions by fuel type.

Altogether, emissions are on a downward trend driven by the decarbonisation of the power sector – the deployment of renewables, coal being replaced by natural gas and an increasing use of biomass[52]. As shown in Figure 5, 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 reversed to 2024 having the lowest share of hard coal since 2013.

[51] 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).

[52] Zero-rated emissions from sustainable biomass account for 22% on top of ETS installations' emissions in 2024.

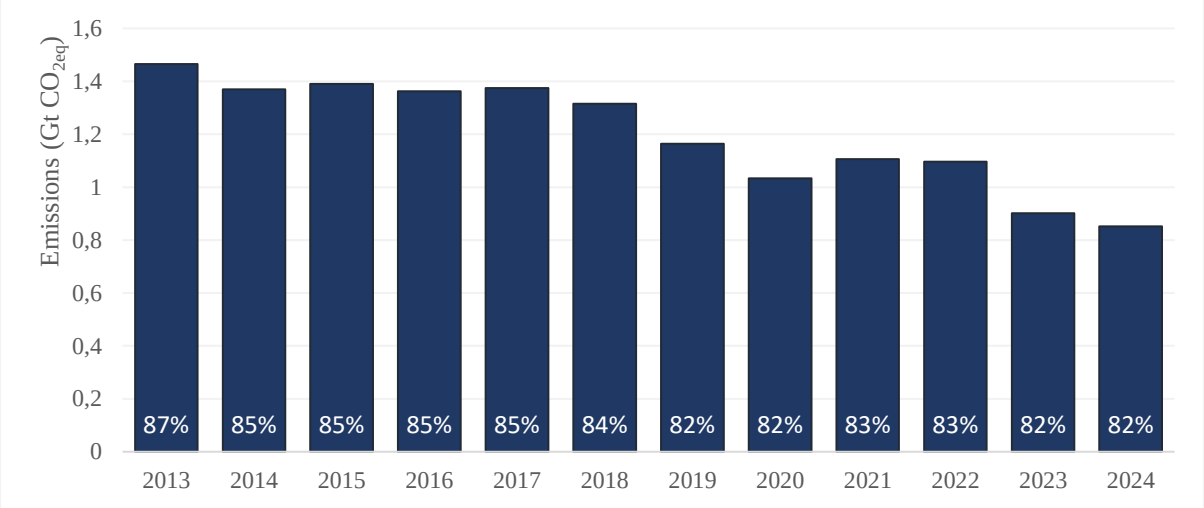


Figure 4. Trend in total emissions from fossil fuel combustion in installations covered by the EU ETS (2013-2024). Labels show the %-share of the installations' total emissions.

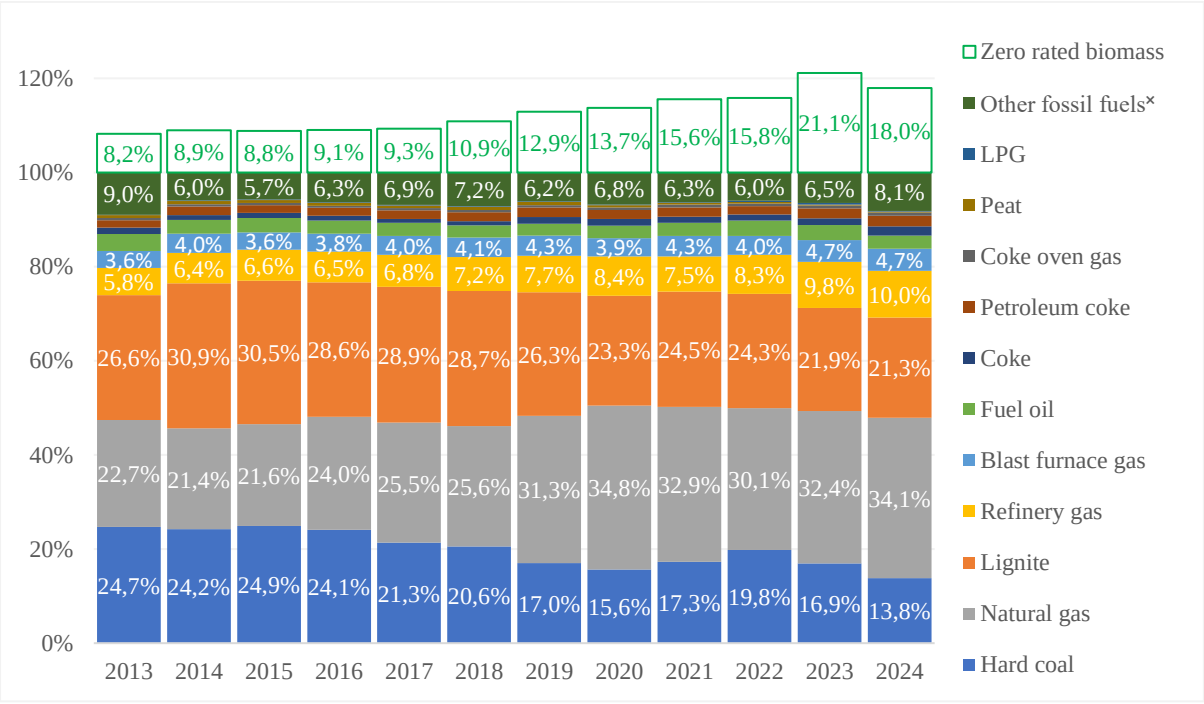


Figure 5 . Trend in the share of emissions from the combustion of different fuels in installations covered by the EU ETS (2013-2024). Labels show the %-share of installations' total combustion emissions. Labels are not shown if emissions from the combustion of a particular fuel never exceed a 3%-share. 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 substantial revenues for Member States to support climate action and energy transformation. In 2024, the total auction revenue amounted to EUR 38.8 billion.

- EUR 24.4 billion went directly to the Member States and EUR 0.3 billion went to Iceland, Liechtenstein, Norway and Northern Ireland.

- EUR 6.3 billion supplied the ETS Modernisation Fund, EUR 2.3 billion supplied the ETS Innovation Fund and the remaining EUR 5.6 billion supplied the Resilience and Recovery Facility to fund the REPowerEU Plan, which Member States use to advance the clean energy transition and boost energy security – by implementing the reforms and investments included in the REPowerEU chapters of their resilience and recovery plans.

Figure 6 shows the distribution of 2024 auction revenue. Detailed revenue data per country and per fund is included in Section 3 of the accompanying staff working document.

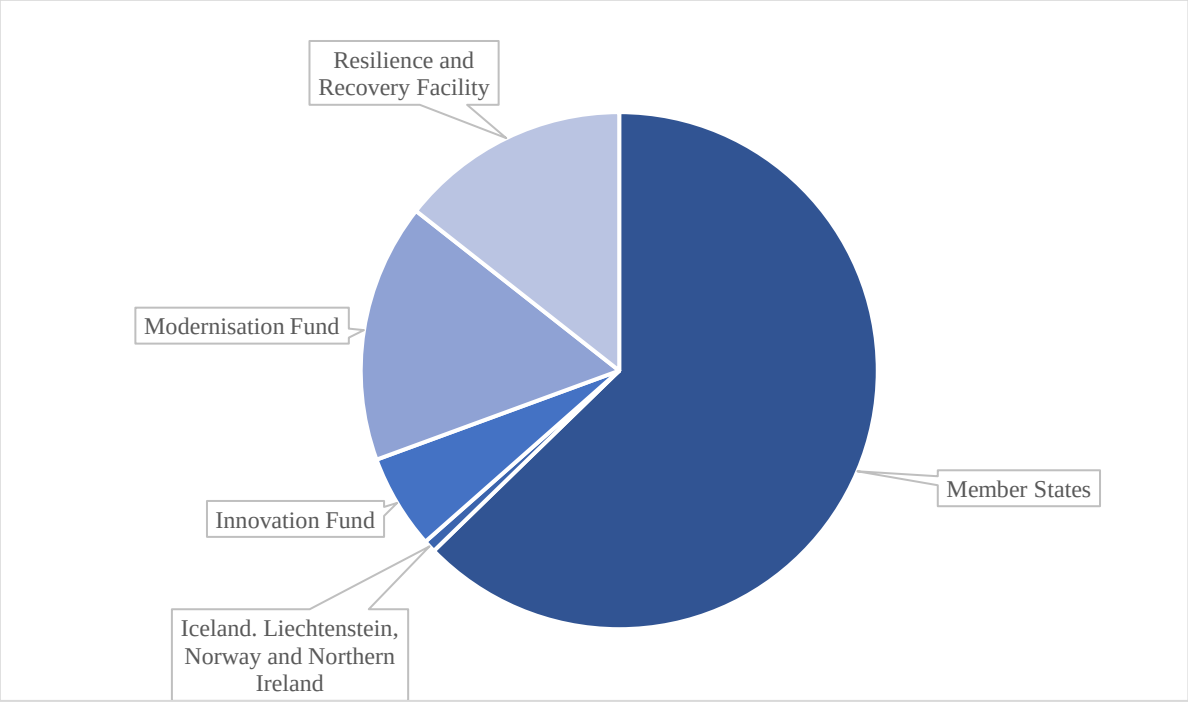


Figure 6. Distribution of 2024 ETS auction revenue between the national budgets, the Innovation and Modernisation Funds and the Resilience and Recovery Facility.

Under Article 10(3) of the ETS Directive, 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 closely monitors 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)[53] on how they use their ETS revenue. These reports are based on templates and submitted via Reportnet 3 managed by the European Environment Agency[54]. They are publicly available on the agency's website. 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 in any gaps.

Of the EUR 24.4 billion that Member States collected in ETS revenue in 2024, EUR 21.2 billion is subject to the obligation under Article 10(3)[55]. This is because EUR 3.2 billion of the 2024 revenue (13%) was reported to have financed aid for electricity-intensive industries for indirect carbon costs. 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 2024 revenue to be used for Article 10(3) purposes, 77% was already disbursed in 2024 and another 3% was committed to specific actions. Future reports will describe how Member States have used the remainder.

From the EUR 21.2 billion, Member States reported[56] having already disbursed EUR 16.4 billion and committed a further EUR 0.5 billion to Article 10(3) purposes. This leaves some EUR 4.3 billion still to be allocated, disbursed and reported.

Table 5 includes a split of the EUR 24.4 billion collected by Member States in ETS revenue in 2024.

Table 5. Split of the EUR 24.4 billion in ETS revenue collected by Member States in 2024.

Revenue (EUR billion)	
Revenue reported as used to finance aid for indirect carbon costs	3.2
Revenue subject to the Article 10(3) obligation and disbursed in 2024	16.4
Revenue collected by Member States in 2024, subject to the Article 10(3) obligation and committed	0.5
Revenue collected by Member States in 2024, still to be allocated, disbursed and reported	4.3

Of the EUR 16.4 billion in revenue reported as generated and disbursed in 2024 on Article 10(3) purposes, EUR 3.2 billion was used for projects in the 'Energy supply - renewables, grids and storage', EUR 3.3 billion for 'Energy efficiency, heating and cooling in buildings' and EUR 3.6 billion for 'Public transport and mobility'. Examples include grants for offshore wind and biogas upgrades in

[53] Regulation (EU) 2018/1999 of 11 December 2018, OJ L 328, 21.12.2018.

[54] Use of ETS auctioning revenues - Reporting year 2025 – GovReg, Reportnet3, European Environment Agency

[55] Up to 4 June 2023, Member States were encouraged to use at least 50% of the revenue collected 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.

[56] 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.

Denmark, deep retrofit projects with at least 40% reduction in heat consumption in residential buildings in Lithuania and investments in rail transport and cycle paths in Slovenia.

In addition, Member States reported having used EUR 0.8 billion for projects in 'Industry decarbonisation (low-carbon technologies, CCUS and energy efficiency in industrial sector excl. energy sector)', including funding for hydrogen projects to decarbonise industry in Germany.

Member States also reported having used EUR 1.4 billion for measures and projects in 'Social support and just transition', including the Greek 'Green Fund' that funds actions for the development of regions transitioning their economies away from fossil fuels as well as projects for the protection and management of forests.

Member States further reported having used EUR 0.5 billion for measures in 'Road transport (cars, trucks)', including financial support for the purchase of electric and/or hybrid vehicles in Sweden, Latvia, Romania and Malta.

For EUR 2.8 billion in 2024 disbursements, Member States reported actions, which either did not fit any category in the templates or fitted multiple categories (in these cases, Member States reported 'Other' for the category). Examples include the biodiversity fund in Spain that enables ecosystems to be restored, renewable energy to be deployed in rural areas, and sustainable land-use practices that jointly increase biodiversity and achieve measurable emission reductions at the landscape level to be upscaled.

Figure 7 summarises Member States' use of ETS revenues in the different categories.

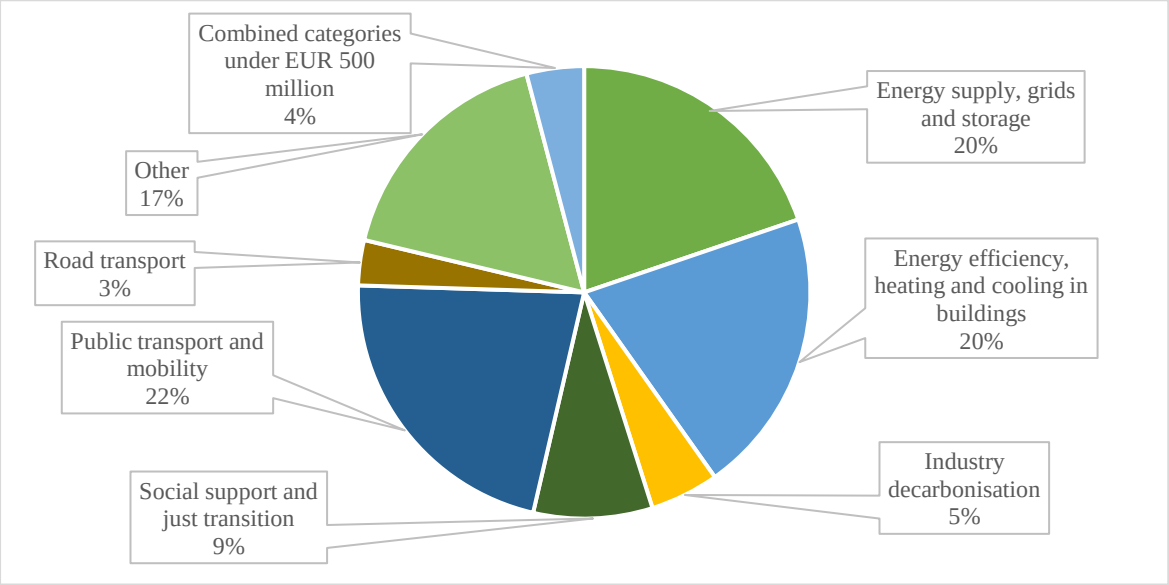


Figure 7. Split per category of the EUR 16.4 billion of the 2024 ETS auction revenue reported as disbursed. Combined categories under EUR 500 million include (in EUR million): adaptation (105), international purposes and international climate finance (94), LULUCF, agriculture and land-based removals (349), administrative expenses (50), waste management (28), maritime transport (29), aviation (14), permanent removals (3).

The EU ETS auction revenue has made an essential contribution to these and many other impactful climate action and energy transformation projects in the Member States. These projects have not only

helped reduce emissions but also ensure that the green transition is just. Importantly, Member States must make an effort to ensure the visibility of the source of funding for the actions or projects funded from ETS revenue to show the EU ETS' contribution to progressive decarbonisation and the just transition. For most actions reported for 2024 it is unclear whether the EU ETS is explicitly indicated and publicised as the funding source, something the Commission intends to follow-up.

An overview of how each Member State used their ETS revenue is included in the 2025 Climate action progress report, in the accompanying staff working document[57].

8.1. Aid for indirect costs

Under Article 10a(6) of the ETS Directive, Member States are encouraged to adopt financial measures in favour of sectors or subsectors at genuine risk of carbon leakage due to significant indirect carbon costs. This refers to the carbon cost passed on to electro-intensive industries through their electricity bills, as a result of energy companies purchasing ETS allowances.

The Commission adopted EU ETS State aid guidelines to harmonise the conditions under which Member States provide this aid and minimise competition distortions in the internal market[58]. These guidelines establish the sectors at genuine risk of carbon leakage due to indirect emission costs and stipulate that 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.

Every Member State that provides State aid to compensate indirect emission costs has notified its scheme to the Commission for State aid assessment and received acknowledgement of the scheme's compatibility with the internal market. Member States providing such compensation are required to publish the total amount of compensation paid, including a breakdown per beneficiary sector or subsector.

In 2024, 15 Member States provided aid for indirect costs incurred in 2023. This is the same as last year. However, the composition has changed following the expiry of a temporary support scheme in Austria and the re-introduction of payments by the Netherlands.

Table 6 summarises the payments made by Member States and compares them to 2023 auction revenues. The total indirect cost payments in 2024 amounted to around EUR 5.52 billion. This is an increase of 40% compared to the EUR 3.95 billion disbursed in 2023, while the number of installations receiving aid was largely unchanged at around 1 850.

Table 6. Aid amounts paid out in 2024 from the ETS auction revenue for indirect costs incurred in 2023.

Member State	Amount paid for indirect costs incurred in 2023 [million EUR]	Number of recipients (installations)	Auction revenues in 2023[3] [million EUR]	Relative size of indirect costs aid compared to auction revenue
Belgium	249.9	56	739.9	33.8%
Czechia	60.4	23	771.3	7.8%
Finland	143.2	55	571.5	25.1%

[57] Forthcoming 2025 Climate action progress report and the accompanying staff working document

[58] Guidelines on certain State aid measures in the context of the system for greenhouse gas emission allowance trading post-2021 (2020/C 317/04). A technical update of these guidelines is being prepared.

France	908.8	293	2,060.1	44.1%
Germany	2,395.0	707	7,582.5	31.6%
Greece	287.0	57	1,441.8	19.9%
Italy	165.5	252	3,547.4	4.7%
Luxembourg	37.6	4	7.6	492.0%
Netherlands	147.3	48	1,261.1	11.7%
Poland	614.6	97	5,406.7	11.4%
Portugal	25.0	23	726.7	3.4%
Romania	116.7	31	571.8	20.4%
Slovakia	58.3	9	377.5	15.4%
Slovenia	25.4	16	186.5	13.6%
Spain	282.8	191	3,514.0	8.0%

The increase in total aid is primarily due to higher allowance prices. Aid in a given year is based on the forward price of allowances in the previous year. Therefore, aid disbursed in 2024 for the costs incurred in 2023 was based on the average forward price in 2022. This price was EUR 83.59, which is an increase of around 50% compared to the previous year[59]. Total aid payments do not automatically increase by the same proportion as the allowance price since Member States' compensation schemes often have a maximum budget calculated for the whole application period (in most cases, 2021-2030).

Aid payments for indirect cost compensation also increased in 2024 when expressed as a share of national auction revenues. The amount paid was equivalent to 19% of the 2023 auction revenue collected by the participating Member States, compared to 16% in 2022. This share has therefore increased, but more slowly than both the allowance price and absolute amount of compensation paid. This is mainly so because i) the effect of higher allowance prices is partly counteracted by the decrease in the absolute volume of auctioned allowances; and ii) the total compensation may be limited by the budgets allocated to each national scheme.

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 level, but five Member States spent more. Justifications provided by these Member States are summarised below.

Aid payments by Belgium, France and Luxembourg have exceeded this threshold for most of the past five years. As in previous years, the high proportion of auction revenue paid in Belgium and France was attributed to the country's high share of low-carbon electricity generation, leading to relatively low auction revenues compared to their share of electro-intensive industries.

[59] According to the State aid guidelines Member States' compensation must be based on the average of one-year forward prices as observed in a given EU carbon exchange. The price used can vary slightly between each Member State depending on the EU carbon exchange used.

In the case of Luxembourg, expenditure continued to far outweigh its total auction revenue. This is due in part to its use of ETS allowances to offset emissions in the sectors covered by the Effort Sharing Regulation[60]. This practice is referred to as ESR flexibility (see Chapter 4.2).

In Finland and Germany, the share of revenue also increased to above 25%. In each case, authorities attributed this to the increase in allowance prices that are used as the basis for compensation. Historical analysis by the German emissions trading authority showed that the 25% threshold has been exceeded four times since 2013 and identified high allowances prices as the main driver in these instances[61].

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 industry, energy, and mobility and buildings, 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 total budget of EUR 40 billion available (based on a carbon price of EUR 75/tCO_2), the Innovation Fund has launched 11 calls for proposals since 2020, including two for auctions under the European Hydrogen Bank.

The Commission reports in more detail on the implementation of the Innovation Fund separately. The third progress report on implementation of the Innovation Fund is expected in Q4-2025[62].

In the 2023 round of calls, which closed in February 2024 (Auction) and April 2024 (Net Zero Technologies), 83 projects joined the Fund's portfolio representing EUR 4.9 billion in support for decarbonisation in energy-intensive industries, hydrogen production, renewable energy generation, mobility sector (including maritime and aviation) and the manufacturing of key net zero technologies. The support is spread over 18 EU and EEA countries, including projects signed for the first time in Estonia and Slovakia. These projects are expected to abate 408 million tonnes of CO_2e over their first 10 years of operation.

For the first time an auction for the production of renewable (RFNBO) hydrogen was held under the European Hydrogen Bank in 2023. Six projects were selected, with a support of EUR 694 million to produce 1.52 million tonnes of renewable hydrogen over their first 10 years of operation. This competitive bidding process ensured cost-effective support for green hydrogen supply to the agriculture, maritime and heavy-duty transport sectors, as well as for the production of e-methane and e-methanol. The 'Auction-as-a-Service' feature was used with Germany contributing EUR 350 million to a national funding window.

In the grants call published in 2023, a manufacturing topic was held for the first time with 20 projects supported with EUR 1.0 billion to produce key technologies in the net-zero transition such as electrolysers, solar panels, batteries, heat pumps and wind turbines. Similarly, the pilot topic, which

[60] The ESR permits Luxembourg to cancel 0.4 million EUAs per year on average between 2021 and 2030, equivalent to EUR 33.5m if auctioned at the market price considered in this chapter.

[61] Beihilfen für indirekte CO2-Kosten des Emissionshandels (Strompreiskompensation) in Deutschland für das Jahr 2023 (link).

[62] European Commission: Directorate-General for Climate Action, *Innovation Fund progress report 2023 – Report from the Commission to the European Parliament and the Council on the implementation of the Innovation Fund in 2023*, Publications Office of the European Union, 2025 (link).

focussed on highly innovative projects with deep decarbonisation potential, was held for the first time with 19 projects were supported with EUR 489 million across a range of sectors including pumped hydro, thermal energy storage, maritime, tidal energy and more.

The remaining projects were in the large-scale topic (23 projects with EUR 2.8 billion in support), medium-scale (14 projects with EUR 434 million) and small-scale (7 projects with EUR 30 million).

By July 2025, the Fund's portfolio included 194 ongoing projects which are planned to receive EUR 11.3 billion in support[63]. These projects are located in 27 EU/EEA countries and are expected to achieve around 860 million in CO_2e emissions savings over their first 10 years of operation.

The incentive provided by the EU ETS carbon price is much higher 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 65 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[64].

At the end of 2024, the Commission launched three new calls with a total budget of EUR 4.6 billion:

- Net-zero technologies: The call for net-zero technologies had a budget of EUR 2.4 billion and received a total of 359 proposals from 28 countries when it closed in April 2025. Together, these projects requested EUR 21.7 billion in support, over nine times the available budget. Preliminary results show that the call covered key decarbonisation areas across several categories: energy-intensive industries (169 proposals), industrial carbon management (24), renewable energy (67), and energy storage (43). Introduced in 2023, the Mobility category, which covers maritime, aviation and road transport, attracted 50 proposals, while the buildings sector received 6 proposals. Notably, there was strong interest from sectors such as chemicals, cement and lime, refineries, and hydrogen. The Commission will publish the results of this call in the second half of 2025.

- Batteries: For the first time, the Commission launched the support for manufacturing of electric vehicle battery cells. The call had a budget of EUR 1 billion and received 14 proposals from eight countries in April 2025. In July 2025, it was announced that six projects were selected for funding under this call from France (two), Germany (two), Sweden and Poland to be awarded combined support of EUR 852 million. These projects will have a combined battery manufacturing capacity of around 56 gigawatt-hours (GWh) of eV battery cells per year.

- Hydrogen auction: The third call for proposals was for the second round of the European Hydrogen Bank auction for the production of renewable hydrogen. The auction opened with total budget of EUR 1.2 billion, including a novel dedicated EUR 200 million budget for projects with off-takers from the maritime sector. The auction closed in February 2025 with 66 bids from 11 countries. 15 projects in five different countries were selected for grant agreement preparation. The scheme also included national envelopes under the 'Auctions-as-a-Service' scheme with Austria providing EUR 400 million, Spain EUR 280–400 million and Lithuania EUR 36 million. The 15 selected projects must present a completion guarantee before signing

[63] Innovation Fund portfolio dashboard

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

the grant agreement. Some of them may decide not to do so, withdrawing from the selection process and creating opportunities for projects from the reserve list to be invited to start preparing the grant agreement. The final list of awarded projects will be published by the end of 2025.

In order to increase the technical, financial and operational maturity of innovative projects, project development assistance (PDA) is administered through the European Investment Bank. In 2024, the EIB signed 23 PDA agreements and proceeded with their execution. Since the start of the programme, 62 projects have signed a support agreement and were completed. The impact of PDA is increasingly visible, with nine projects that had previously been unsuccessful having secured a grant under the 2023 Innovation Fund Call. PDA has also been expanded now to be open to project developers who have not yet applied to the Fund, with applications directly to the EIB[65].

Since 2023, all projects that meet the minimum thresholds for all award criteria in the regular grant calls (whether selected for the Innovation Fund or not) have received the STEP (Strategic Technologies for Europe Platform) Seal[66]. The Seal is the EU quality label awarded to high-quality projects that contribute to STEP objectives and helps facilitate access to funding from Member States or private investors.

8.3. ETS Modernisation Fund

The Modernisation Fund is a solidarity programme financed by the EU ETS. Initially supporting 10 lower-income Member States[67], from 2024, the fund supports three additional lower-income Member States[68], 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[69]. 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.

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.

[65] Innovation Fund - Project Development Assistance, EIB.

[66] Regulation (EU) 2024/795 of 29 February 2024, OJ L, 2024/795, 29.2.2024, ELI: http://data.europa.eu/eli/reg/2024/795/oj.

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

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

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

Since January 2021, around 200 schemes and individual projects have been confirmed for a total amount of EUR 19.1 billion, which has been disbursed to beneficiary Member States. These initiatives mostly relate to renewable energy, energy efficiency, energy storage and the modernisation of energy networks.

In June 2025, the Commission adopted the eighth disbursement decision[70] under the Modernisation Fund, the largest since 2021. On this basis, the EIB made payments for a total of EUR 3.7 billion to nine beneficiary Member States[71] to finance 34 investment proposals. Projects include support development of clean air programme supporting energy efficiency improvements and heat source replacements in single-family houses in Poland and increasing the electricity grid capacity in Latvia.

Submissions for another round of proposals under the Modernisation Fund closed on 12 August 2025 for non-priority projects and on 9 September 2025 for priority projects.

As of 2025, investments must also comply with the 'do no significant harm' requirements under the Taxonomy Regulation (except for investments funded using the transferred allowances).

8.4. ETS Decarbonisation Fund for Greece

Article 10a(9) of the ETS Directive granted Greece the right, under certain conditions, to claim up to 25 million allowances to decarbonise the electricity supply of its islands[72]. The auctioning of these allowances will finance the Fund, which is estimated to be worth around EUR 2 billion. Greece, the European Commission and the EIB are working to operationalise this provision. In November 2024, the Executive Vice-President for the European Green Deal, Maroš Šefčovič, together with Greece's Minister of Environment and Energy, Theodoros Skylakakis, and EIB Vice-President, Ioannis Tsakiris, signed a trilateral agreement in Naxos, Greece, to set up the national ETS Decarbonisation Fund for the Greek islands[73].

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, 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, such as photovoltaic systems, offshore windfarms and stand-alone storage systems, as well as initiatives to connect islands with the mainland's electricity grid. The Fund will also contribute to climate adaptation measures and enhance resilience against extreme weather events.

[70] 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

[71] 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).

[72] 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).

[73] Executive Vice-President Šefčovič signs agreement between Greece, European Investment Bank and the Commission on a Decarbonisation Fund for Greek islands - European Commission.

9. Aviation

The EU ETS has regulated emissions from the aviation sector since 2012. Legally, the system covers all outgoing flights from to the EEA, and incoming flights if not exempted.

In 2013, however, the EU limited ETS obligations for the aviation sector to flights within the EEA, to support the development of a global market-based measure to reduce aviation emissions by the International Civil Aviation Organization (ICAO)[74]. The ETS Directive coverage limitation 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[75]. Flights to and from around 75 least developed countries and Small Island Developing States are exempted on an ongoing basis.

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 keeping a level 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[76] 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[77].

In parallel, to facilitate progress at the ICAO, the limited, intra-European scope of the EU ETS for aviation was extended until the end of 2026, as all major non-EU countries should be applying the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) from 2027. As part of the mid-2026 ETS review, the Commission is required to assess whether non-EU states considered to be participating in CORSIA represent more or less than 70% of international aviation emissions, based on the most recent emission figures (ETS Directive Article 28b 3(b)). This approach aims to incentivise all countries which should participate in CORSIA when it becomes 'mandatory' to implement the scheme[78]. Overall, the EU encourages all countries to participate.

The assessment mandated by the ETS Directive sets out clear parameters for the calculation of the 70% threshold. The numerator counts international aviation emissions represented by "*states listed in the implementing act adopted pursuant to Article 25a(3)*", meaning states other than EEA countries, Switzerland and the United Kingdom. The numerator therefore includes emissions from routes between the states listed in the implementing act, as well as routes between an EEA Member State or Switzerland or the United Kingdom and these states. The assessment follows the route-based principle, i.e. assuming

[74] Decision No 377/2013/EU of 24 April 2013 derogating temporarily from Directive 2003/87/EC, OJ L 113, 25.4.2013.

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

[76] 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.

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

[78] Countries had the largest share of international aviation activity in 2018 measured in 'revenue tonne kilometres', meaning how much paying cargo or passengers an airline moved, and how far. These 34 States are listed at International-RTK-rankings_2018_SIDS_LDC_LLDC.pdf.

that any flight on these routes is subject to CORSIA offsetting, even if it is operated by a carrier hailing from a non-participating state[79]. This prevents underestimation. The denominator of this calculation is all "*international aviation emissions*", meaning all emissions on routes between two ICAO countries. Figures published[80] by the ICAO Secretariat will be used for this calculation, which are either directly reported by countries, or else gap-filled by the ICAO Secretariat according to an agreed methodology. The calculation is as follows:

$$\frac{CO_2\ emissions\ relating\ to\ non-European\ States\ on\ routes\ between\ countries\ participating\ in\ CORSIA\ offsetting}{CO_2\ emissions\ on\ international\ routes}$$

In 2024, around 27.6 million aviation allowances were issued in line with the applicable scope of the EU ETS. Free allocation amounted to 17.5 million allowances. Aircraft operators administered by national administrators in the EEA received a little more than 0.3 million Swiss aviation allowances for free under the Swiss ETS. Approximately 6.7 million aviation allowances were auctioned in 2024.

Emissions from aircraft operators continued to increase in 2024 compared to 2023. In 2024, emissions amounted to 62.6 Mt CO_2eq (including 1.1 Mt of operators administered by Switzerland), up from 54.3 Mt in 2023. This is partly due to the broadening of geographical scope for outermost regions. Table 7 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[81] and to implement CORSIA for extra-European flights of EU-based airlines in EU law[82]. They are currently being implemented.

To implement CORSIA in EU law, the Commission adopted in July 2025 the list of states considered to be applying CORSIA for emissions in 2025[83]. This list is updated annually. In July 2024, the Commission published the rules for calculating offsetting requirements under CORSIA[84]. 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 is publishing more data on aviation emissions, while protecting commercially sensitive data. In June 2025, the Commission published

[79] CORSIA's route-based approach means that wherever the airline is based, it should always be subject to offsetting requirement on routes between two participating states. The airline's 'home country' is the only responsible for the airline's CORSIA compliance. For example: Airline A from country A which is exempt from CORSIA should still participate in offsetting when it flies covered routes between participating countries B and C. Country A is meant to be responsible to ensure airline A's compliance on these flights, for there to be a level-playing field.

[80] The ICAO Secretariat publishes this document on an annual basis, for 2024 it was published in October, entitled "Total Annual CO2 Emissions and Information for Aeroplane Operators", accessible under Part III of this website: https://www.icao.int/environmental-protection/CORSIA/Pages/CCR.aspx

[81] Directive (EU) 2023/958 of 10 May 2023 amending Directive 2003/87/EC, OJ L 130, 16.5.2023.

[82] Decision (EU) 2023/136 of 18 January 2023 amending Directive 2003/87/EC, OJ L 19, 20.1.2023.

[83] Commission Implementing Regulation (EU) 2025/1500 of 23 July 2025, OJ L, 2025/1500, 24.7.2025, ELI: http://data.europa.eu/eli/dec/2022/1500/oj.

[84] Commission Implementing Regulation (EU) 2024/1879 of 9 July 2024, OJ L, 2024/1879, 10.7.2024, ELI: http://data.europa.eu/eli/reg_impl/2024/1879/oj.

aggregated annual emissions data from aerodrome pairs within the EEA in 2023[85]. This was a first step in publishing all data for 2023.

Table 7. Aviation in the EU ETS (2019-2024) – verified emissions [million tonnes CO_2eq], free allocation and allowances auctioned [million allowances]. Data extracted from the Union Registry on 1 October 2025.

Year	2019	2020	2021	2022	2023	2024
Verified emissions-aviation	68.2	25.2	27.9	49.5	54.3	62.6
Change year-on- year[86]	+1%	−63%	+30%	+77%	+9.7%	+15.3%
Free allocation (EU27 + Iceland, Liechtenstein, and Norway + UK + Switzerland)[87]	31.3[88]	32.5	24.0	23.1	22.5	17.5
Allowances allocated for the support of SAF uplift (FEETS)	/	/	/	/	/	1.3
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	6.7

The 2023 revision of the ETS Directive has advanced 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 2025, 50% fewer free allowances are allocated to aircraft operators.

Aviation decarbonisation is urgently needed. The ETS carbon price already provides an incentive of around EUR 200 per tonne of sustainable aviation fuel used, compared to fossil kerosene. In 2025, the Commission implemented an additional support mechanism under the EU ETS for the use of sustainable aviation fuels. For each tonne of eligible fuel used on an ETS route airlines can claim support of around

[85] Publication of 2023 emissions data from aerodrome pairs - European Commission, DG Climate Action, 19.6.2025

[86] 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.

[87] 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.

[88] 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.

EUR 500 up to EUR 7 000 [89] per tonne of fuel. This incentive has been available for eligible fuels uplifted on ETS routes since 1 January 2024. For 2024, the incentive from EU ETS (as the operators are not required to surrender allowances) was worth around EUR 25 million. This was supplemented by ETS support of about 1.3 million allowances worth approximately EUR 100 million[90].

Recognising that non-CO_2 aviation effects can no longer be ignored[91], the EU is the first jurisdiction to introduce a monitoring, reporting and verification framework for these effects (see Chapter 11.1.2).

10. Maritime transport

Maritime transport is a major emitter of greenhouse gases. Emissions from maritime transport activities are included in the EU ETS as part of the EU's overall strategy to decarbonise shipping. From 1 January 2024, the EU ETS scope includes emissions from maritime transport activities for 50% of emissions from voyages starting or ending outside of the EEA and 100% of emissions that occur between two EEA ports and when ships are within an EEA port.

This extension of the EU ETS builds on the provisions in place for other sectors covered by the EU ETS system as well as the Maritime Monitoring, Reporting and Verification (MRV) Regulation[92]. For 2024 and 2025, the EU ETS maritime only covers CO_2 emissions, but will to be extended to CH_4 and N_2O as of 2026. Shipping companies have reported 89.8 million tonnes CO_2 of verified emissions for 2024[93].

Shipping companies' obligation to surrender allowances is introduced gradually, through a phase-in period lasting until 2026. During this period, shipping companies are required to surrender allowances in 2025, for 40% of the emissions reported in 2024, and in 2026 for 70% of emissions reported in 2025. A further reduction is made for ice-class vessels.

Shipping companies were required to report their 2024 emissions by 31 March 2025 and surrender the corresponding number of emissions allowances by 30 September 2025.

The surrendering requirements, after applying of deductions and the phase-in coefficient for 2024, corresponded to 35.6 million EU allowances. To bridge the gap between verified emissions and surrendered allowances from maritime transport, 54 243 768 allowances are being cancelled for 2024.

---

[89] This support system covers all or part of the remaining price difference between fossil kerosene and the eligible aviation fuels used by individual commercial aircraft operators on their flights covered by effective carbon pricing through the EU ETS, encouraging these aircraft operators towards cleaner fuel options.

Commission Delegated Regulation (EU) 2025/723 of 6 February 2025, OJ L, 2025/723, 16.4.2025, ELI: http://data.europa.eu/eli/reg_del/2025/723/oj.

Commission Notice C/2025/3186, OJ C, C/2025/2934, 27.5.2025, ELI: http://data.europa.eu/eli/C/2025/2934/oj.

[90] Commission Decision of 12 September 2025, OJ C, C/2025/5004, 16.9.2025, ELI: http://data.europa.eu/eli/C/2025/5004/oj.

[91] 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.

[92] 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)

[93] Verified emissions for maritime in the Union Registry on 15 October 2025.

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. In addition, the Commission will review the EU ETS for maritime transport in 2026, including by exploring a potential extension of its scope to ships below 5 000 gross tonnage but not below 400 gross tonnage, and assessing relevant developments in the International Maritime Organisation (IMO). In April 2025, the IMO approved the Net-Zero Framework (IMO NZF), including a global standard for gradually reducing the GHG intensity of marine fuels and a pricing element for GHG emissions from international shipping, which the EU welcomed. The agreement, pending its adoption, is a meaningful step towards the goal of net-zero emissions from maritime transport by or around, i.e. close to, 2050 as set in the 2023 IMO GHG strategy. Discussions on the adoption of the agreement have been postponed until October 2026.

11. EU ETS implementation framework

A smoothly functioning and environmentally credible EU ETS hinges on a robust framework of monitoring, reporting, verification and accreditation (MRVA) requirements. These requirements are harmonised in the Monitoring and Reporting Regulation and the Accreditation and Verification Regulation (Regulation 2018/2067)[94]. Countries are required to report on the implementation of these Regulations and of the ETS Directive every year.

This chapter recaps the key data on the implementation of the EU ETS that countries reported under Article 21 of the ETS Directive for 2024. The implementation framework aspects for maritime are detailed in Chapter 11.6.

By 27 October 2025, the day this report was finalised, Cyprus had still not submitted their report for 2024. In the absence of the latest available for Cyprus, this chapter uses the data reported by Cyprus for 2023 as a proxy to make year-to-year comparison possible. For all other countries, 2024 data are used.

11.1. Monitoring and reporting of emissions

The emissions' monitoring regime 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 2024, four countries[95] (five

[94] Commission Implementing Regulation (EU) 2018/2067 of 19 December 2018, OJ L 334, 31.12.2018. The regulation was amended in 2020 by Commission Regulation (EU) 2020/2084, in 2024 by Regulation (EU) 2024/1321, and in 2025 by Regulation (EU) 2025/1192. See consolidated text.

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

in 2023) continued to allow installations to use simplified monitoring plans in low-risk cases[96]. For aviation, this provision is only in use for small emitters in Belgium.

Installations continued to follow legal requirements for emissions monitoring. Most used the calculation-based methodology[97] to calculate their emissions. Only 274 installations (3.2%) in 23 countries reported using continuous emissions measurement systems (CEMS). Of these, 221installations used CEMS to measure CO_2 emissions, 40 to measure N_2O and 13 to measure both gases. CEMS is used most frequently in France. In 163 installations, the measured emissions also contained biogenic CO_2. Of the installations using CEMS, 189 used the methodology for more than 95% of their emissions, while the other 85 used a combination of CEMS and a calculation-based methodology.

Only 12 countries reported using the fall-back approach. This approach was used for 31 installations covering approximately 2.0 Mt CO_2eq (six more installations than in 2023 but 0.6 Mt CO_2eq lower in emissions' terms). One installation in the Netherlands is responsible for 52% of the overall emissions reported using the fall-back methodology due to its complex set-up.

Most installations met the minimum tier requirements[98] of the Monitoring and Reporting Regulation in 2024. Only 97 category C installations (98 in 2023) 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 18 different countries (17 in 2023) and represented 17.1% 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 costs. Once these conditions no longer apply, the operator must improve the monitoring system accordingly.

11.1.1. Monitoring and reporting of emissions from municipal waste incineration

By 31 July 2026, the Commission must assess the feasibility of including emissions from municipal waste incineration (and possibly other waste management processes) in the EU ETS. This assessment is part of a broader review of the EU ETS, for which the proposal is expected in 2026.

Since January 1, 2024, installations for the incineration of municipal waste (above the threshold of 20 MW rated thermal input) are required to monitor and report their emissions under the EU ETS. They are not, however, currently required to surrender allowances for their emissions. 18 countries (17 Member States and Norway) reported emissions from combustion of fuels in installations for the incineration of municipal waste for 2024[99].

11.1.2. Monitoring and reporting of non-CO2 aviation effects

[96] Article 13 of the Monitoring and Reporting Regulation.

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

[98] 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.

[99] Not all countries in the EU ETS have municipal waste incineration capacity or installations falling within the scope of the EU ETS monitoring obligation.

Since 1 January 2025, aircraft operators must monitor and report non-CO2 aviation effects. The obligation covers sulphate and soot particulate matter, water vapour, nitrous oxides and sulphur dioxide, airplanes emit during the flight. To facilitate the start, until 2026, mandatory monitoring and reporting obligation of non-CO_2 effects applies only to intra-EEA flights (including the outermost regions), as well as flights from the EEA to Switzerland and the United Kingdom. Voluntary reporting on all routes is encouraged. From 2027, the reporting obligation automatically applies to all flights.

Aircraft operators can choose one of two methods to monitor their non-CO_2 aviation effects. Method C is the standard method taking into account weather and flight information, along with aircraft and fuel properties, whereas Method D, uses a more simplified monitoring methodology to calculate emissions from low-emission aircraft operators, as it mainly requires flight and trajectory information. Weather data and data on the fuel properties can be omitted.

To facilitate the monitoring and reporting process, the Commission is developing the NEATS monitoring tool. The first reports are due in 2026.

By 31 December 2027, based on the results of the application of the monitoring framework of non-CO_2 aviation effects, the Commission will submit a report and, where appropriate, a legislative proposal to mitigate non-CO_2 effects.

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[94], ISO 17029 and ISO 14065 (international ISO standards that are used to accredit verifiers). Accredited verifiers can operate with mutual recognition 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 2024 is included in Section 4 of the accompanying staff working document.

In 2024, there were 94 accredited verifiers for installations, and 17 for aircraft operators. In addition, 26 countries reported that at least one foreign verifier was active in their territory in 2024, and six 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 2024, Only one verifier suspension (Romania) was reported. At the same time, no verifiers were reported to have had their accreditation withdrawn. In two cases, verifiers' scope of accreditation was reduced (Denmark and France). By comparison, no suspensions, no withdrawal of accreditation and two scope reductions were reported for 2023.

The second revision of the Accreditation and Verification Regulation was adopted on 18 June 2025[100]. The purpose of the revision was to:

- align with the revisions that were incorporated in the Monitoring and Reporting Regulation in 2024:

[100] Commission Implementing Regulation (EU) 2025/1192, OJ L, 2025/1192, 19.6.2025
ELI: http://data.europa.eu/eli/reg_impl/2025/1192/oj.

- include requirements on the verification of reports on the non-CO_2 aviation effects, verifier's checks related to the transport of CO_2 and CCU, verifier's checks related to biomass, renewable fuels of non-biological origin (RFNBO), recycled carbon fuels (RCF), synthetic low carbon fuels (SLCF), and verifier's checks related to alternative aviation fuels and fuels eligible for ETS support;

- specify the verifier's role in the ETS2 for specific simple monitoring cases and further simplifying verification in such cases.

- Align with the Free Allocation Regulation to include the verification of climate-neutrality reports.

11.3. Guidance documents

The Commission has developed guidance documents[101] for monitoring, reporting, verification and accreditation. The aim is to provide detailed instructions, techniques and best practice to competent authorities, operators, verifiers and other stakeholders on how to implement the EU ETS. This guidance plays a vital role in ensuring the integrity, transparency, harmonisation and accuracy of 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 was given to the general guidance document for installations (published in early 2025), followed by the guidance documents for aircraft operators, on 'biomass fuels and other zero-rating', guidance on verification, etc., all of which are expected to be published in the second half of 2025.

At the same time all MRV reporting templates were updated in early 2025 to accommodate new provisions of the two regulations. As a final point, the ETS2 monitoring and reporting guidance is being updated. The ETS2 accreditation and verification guidance was published in June 2025[102]. All secondary guidance documents are planned to be updated through the course of 2025.

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 Section 4 of the accompanying staff working document.

All countries reported having at least one central competent authority involved in implementing the EU ETS in 2024. In six countries, only a single, central competent authority was responsible for all EU ETS activities[103]. Where multiple competent authorities are managing EU ETS activities, countries reported

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

[102] Guidance Document, The Accreditation and Verification Regulation - ETS2 Verification Guidance, June 2025.

[103] These countries were Czechia, Denmark, Ireland, Iceland, Italy and Liechtenstein.

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 (11 countries), playing a coordinating role[104] (ten countries), a central competent authority issuing binding instructions and guidance to local authorities (five countries), providing joint training for competent authorities (eight countries) and convening regular working groups or meetings between authorities (14 countries).

In 2024, 16 countries did not charge administrative fees to installation operators for the permitting and approval of monitoring plans (same as in 2023). Aircraft operators in 18 countries also did not have to pay any fees (17 in 2023). Charges varied significantly by country and type of service – from about EUR 19 to EUR 9 300 for a permit and approval of a monitoring plan for installations, and from about EUR 2 to EUR 4 700 for aircraft operators. In addition to initial approval, 13 countries reported also charging administrative fees of different amounts for significant changes to permits or monitoring plans. An overview of administrative charges in the EU ETS is presented in Section 4 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 installation or an aircraft 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.

For each tonne of CO_2 emitted for which no allowance was surrendered on time, the ETS Directive imposes a penalty of EUR 100[105]. 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 measures and excess emissions penalties within the EU ETS is presented in Section 4 of the accompanying staff working document.

In the 2024 compliance cycle, the level of compliance with the EU ETS remained very high. Like in recent years, operators responsible for over 99% of emissions from power generation, industrial manufacturing and aviation met their legal obligations on time.

The efficiency of the compliance system has also improved, with a broader uptake of electronic reporting. In 2024, 17 countries used an automated system for electronic data exchange between operators or aircraft operators. Ten 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, 12 countries (nine in 2023) allowed verifiers to carry out virtual site visits[106]. For 27 installations and 46 aircraft operators, virtual site visits were approved by the relevant

[104] 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.

[105] The penalty is indexed for inflation.

[106] Article 34a of the Accreditation and Verification Regulation allows the verifier to carry out a virtual site visit if extraordinary and unforeseeable circumstances prevent 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.

competent authority. In 2024, the Accreditation and Verification Regulation was amended to extend the possibilities for virtual site visits for the aviation sectors. Verifiers are now also allowed to carry out virtual site visits beyond force majeure circumstances provided certain conditions have been met.

Compliance checks on annual emissions reports are carried out by all countries that administer any operators, which is not the case for installations in Liechtenstein and aircraft operators in Liechtenstein and Northern Ireland. For various types of checks, the percentage of emission reports checked are reported, see Section 4 of the accompanying staff working document. In 2024, Italy did not report on the types of checks made, all other relevant competent authorities checked the completeness of the reports from installations, and most, including Italy, did so for reports from aircraft operators. The exceptions were the competent authorities in France, Greece, Latvia and Norway, Lithuania reported checking emissions against other sources.

Competent authorities in 12 countries made conservative estimates for 62 installations (approximately 0.55% of all installations, same level as in 2023). For some installations the emissions were estimated for multiple years, a total of 87 estimates were made, of which 33 concerned 2024, the remainder were conservative estimates of previous years. Conservative estimation of emissions according to Article 70 MRR were made when the annual emission reports were not submitted in time, when a negative verification opinion statement was issued because of limitation of scope, material misstatement or non-conformity provide insufficient clarity to state with reasonable assurance that the report is free from material misstatements. Such an estimation will also be made if the emission report is found not to be in compliance with the Monitoring and Reporting Regulation.

Conservative estimates for aviation were reported by three countries (also three in 2023) concerning 17 aircraft operators (22 in 2023).

Checks by competent authorities remain important to supplement the work of verifiers. In addition to checking emissions reports, 18 countries reported that they had carried out on-site inspections at installations (19 in 2023). Five countries[107] reported on-site inspections for aviation (three in 2023).

In 2024, 31 installations in nine countries were fined for not surrendering sufficient emission allowances to cover their reported emissions (excess emissions). For aviation, excess emissions penalties were reported by six countries for 11 aircraft operators. Regarding emissions obligations for installation, a total of 47 infringements were reported across 12 countries[108], which resulted in 36 penalties with a combined total of EUR 476.5 million, formal warnings or formal notices. For installations that applied for the allocation of free emission allowances, there were four infringements reported across three countries[109], of which two resulted in fines, totalling EUR 0.07 million.

For aviation 19 infringements across six countries were reported[110], of which 13 led to monetary fines, totalling EUR 4.1 million. The main reasons were failure to meet emissions reporting deadlines and failure to surrender the required allowances.

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

[108] The 12 countries are Croatia (5), Czechia (5), Finland (1), France (4), Hungary (6), Italy (3), Latvia (1), Lithuania (2), Netherlands (1), Poland (18), Spain (1), and Sweden (1).

[109] The three countries are Hungary (1), Latvia (1), and Sweden (2).

[110] The six countries are Denmark (2), Croatia (2), Italy (6), Latvia (2), Spain (6), and Sweden (1).

11.6. Implementation framework for maritime transport

The framework of monitoring, reporting, verification and accreditation requirements applicable to maritime transport is modelled on the one established for other sectors under the EU ETS, with the necessary adaptations. The Maritime MRV Regulation was revised in 2023 to allow for the EU ETS extension to maritime transport, notably to extend the scope of the MRV system to CH_4 and N_2O (from 2026) and to set out rules to determine emissions by ships under the scope of the EU ETS and aggregate them at shipping company level. The relevant delegated acts to implement the system were adopted in 2023, after which the Commission developed a set of guidance documents to help stakeholders comply with their legal obligations[111].

11.6.1. Monitoring and reporting of emissions

Shipping companies have been required since 2018 to monitor and report emissions in accordance with the MRV Maritime Regulation, under which companies have to provide monitoring plans, emissions reports, and verification reports, for each of the ships under their responsibility. From 2024, they also need to provide data on a per company basis, with additional data reported for the EU ETS, providing an aggregated report of all their ships.

For this purpose, only one single monitoring and reporting process is required, although the data to be reported within the EU ETS may deviate, to a certain extent, from those to be reported under the MRV Maritime Regulation, e.g. regarding the scope (GHG gases, coverage of voyages), and the different applicable derogations as established by the EU ETS Directive. In addition, companies active under the EU ETS scope must fulfil additional requirements to ensure they comply with their obligations under the EU ETS Directive (e.g. have their monitoring plan approved by the relevant administering authority, open a Maritime Holding Operator Account in the Union Registry, etc.) compared to those companies only active under the Maritime MRV scope.

In 2024, 3 313 shipping companies have submitted a company-level emissions report, covering 13 627 ships. These companies reported 138.3 Mt of CO_2 under the broader MRV scope[112], resulting from the use of 44.7 million tonnes of fuel, out of which marine fossil fuels[113] accounted for 99.4% of reported consumption[114] and 0.6% benefited from zero-rating.

The reported verified emissions at company level under MRV scope were reduced, as recorded in THETIS-MRV, to determine emissions under the scope of the EU ETS after applying the relevant rules: zero-rating for eligible fuels (0.7 Mt), ETS geographical scope limited to 50% of extra-EEA voyages (48.6 Mt), carbon capture storage and carbon capture utilisation (56 tonnes), and derogations for small

[111] At the time of writing three main guidance documents have been finalised through 2024/2025 and are currently publicly available: the MRV/ETS general guidance for shipping companies (Guidance Document No. 1), the general guidance on the process for approval of monitoring plans by administering authorities (Guidance Document No. 2), and the general guidance on accreditation and verification (Guidance Document No. 3).

[112] This figure covers the emissions from the ships under the responsibility of shipping companies active under the EU ETS scope, excluding those ships and activities which only fall under MRV scope (e.g. due to gross tonnage, ship type) and excludes methane and nitrous oxide emissions. The data mentioned under this section has been extracted from THETIS-MRV as reported in the company-level reports submitted by shipping companies on 15 October 2025.

[113] Fuels falling under the fuel class 'fossil fuels', in accordance with the classification under Annex I, Part A of Regulation (EU) 2015/757.

[114] As in previous reporting periods under the MRV maritime system before the EU ETS extension to maritime, shipping companies exclusively relied on the calculation approach to determine emissions.

islands, for public service contracts and public service obligations, and for outermost regions (3.9 Mt)[115].

11.6.2. Verification and accreditation

As for other ETS sectors, the verifier active in ETS maritime must be accredited by a national accreditation body in line with the Accreditation and Verification Regulation and ISO 14065 (an international ISO standard). The verifier carries out the various activities required by the MRV Regulation to check the implementation of the monitoring plan and the data in the shipping company's reports, both at ship and company level.

In 2024, 22 accredited verifiers were active for maritime MRV. Verifiers' compliance with the accreditation and reporting rules for maritime is found to be high. For 2024, no verifier suspensions or withdrawal of a verifier's accreditation were reported.

11.6.3. Administering authorities

For a smooth and effective operation of the EU ETS, each shipping company is assigned to one administering authority in one Member State. This is the Member State to which the shipping company submits the monitoring plan for approval, the verified annual emissions report (ER) and company emission report (CER), and which administers the shipping company with regard to its Registry account. Each shipping company is assigned to its administering Member State by applying the rules set in the EU ETS Directive[116].

11.6.4. Compliance with the EU ETS for maritime transport

2025 was the first year when allowances for emissions from maritime transport were surrendered in the EU ETS, on the basis of what reported for 2024 activities. Shipping companies surrendered allowances for more than 99% of surrendering requirements [117] by the legal deadline.

11.6.5. Implementation of ETS2

The Monitoring and Reporting Regulation and the Accreditation and Verification Regulation also include the MRVA requirements for the implementation of the ETS2. To facilitate the implementation of the new system, the Commission has prepared guidance documents and templates for national competent authorities, regulated entities and verifiers[118].

- general guidance on the Monitoring and Reporting Regulation for ETS2 regulated entities;
- monitoring plan template for regulated entities;
- annual emission report template for regulated entities;
- guidance on accreditation and verification for ETS2

[115] A further 0.5 Mt were deduced following the voluntary application of the deduction for ice-class ships.

[116] Article 3gf of the EU ETS Directive.

[117] The amount of reported due allowances is determined on figures reported by companies in the Union Registry on 1 October 2025.

[118] ETS2: buildings, road transport and additional sectors, DG Climate Action.

- ETS2 verification report template

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)[119], 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 had to submit their final updated NECPs by 30 June 2024.

In May 2025, the Commission published its EU-wide assessment of the NECPs, following their updates to take into account the 2030 targets[120]. The assessment was accompanied by a staff working document providing an individual assessment of the first 23 plans submitted[121]. Subsequently, the Commission published its assessment of the final NECPs from Estonia and Slovakia in October 2025[122]. Belgium submitted its final NECP in October 2025. Poland is the only Member State yet to submit their final updated NECP. The findings of the analysis of the updated NECPs are also discussed in theClimate Action Progress Report 2025[123].

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 (see Chapter 8). Of the 2024 ETS revenues, 15 Member States reported spending EUR 3.3 billion to fund 63 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

[119] Directive (EU) 2023/1791 of 13 September 2023 amending Regulation (EU) 2023/955 (recast), OJ L 231, 20.9.2023.

[120] COM(2025) 274 final - EU-wide assessment of the final updated national energy and climate plans - Delivering the Union's 2030 energy and climate objectives, 27.5.2025. See the accompanying staff working document.

[121] See footnote 121.

[122] Commission assessment of the final updated NECPs of Estonia and Slovakia (SWD/2025/282).

[123] https://climate.ec.europa.eu/eu-action/climate-strategies-targets/progress-climate-action/eu-climate-action-progress-report-2025_en

Agreement[124] 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 geographical coverage, cap and allocation as the EU ETS. In line with Article 7 of the Linking Agreement, this continues 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 maintains the environmental integrity of both systems. Both the EU ETS and the Swiss ETS cover respective departing flights to the UK and flights to/from the EU's outermost regions.

Tables 16 and 17 in Section 5 of the accompanying staff working document show key figures for both systems in 2024 – 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. Since 2024, the number of transfers between both systems, i.e. daily execution of transactions, increased considerably, from 156 in 2023 to almost 800 in 2024, allowing market participants from both Switzerland and the EU to act as if they were in one market and 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.

Tables 8 and 9 present the effect of the link between the EU ETS and the Swiss ETS in 2024. They show to what extent companies in either system used allowances issued in the other system for compliance.

In total, regulated entities in the EU ETS (both installations and aircraft operators) used 1 578 101 allowances issued under the Swiss ETS for compliance in 2024. This is almost 440 000 allowances more than in 2023 and almost 605 000 allowances more than in 2022, marking an increased use of the flexibility provided by the link between the EU ETS and the Swiss ETS as well as a consistently growing awareness and acceptance of the link.

Installations in the EU ETS used significantly more aviation allowances issued under the Swiss ETS than in the previous year (around 355 000 in 2024 compared to 100 000 in 2023). They also increased the use of the Swiss ETS general allowances (around 700 000 in 2024 compared to 425 000 in 2023).

The number of the Swiss ETS general allowances used for compliance by EU aircraft operators in 2024 remained stable at around 49 000 (compared to 50 000 in 2023). The number of the Swiss ETS aviation allowances used for compliance by aircraft operators in the EU ETS decreased from around 560 000 in 2023 to around 470 000 in 2024.

[124] 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).

In relative terms, allowances issued under the Swiss ETS accounted for around 0.14% of the total allowances surrendered in the EU ETS in 2024. However, they accounted for a bigger share of 31.5% of all the Swiss ETS that year.

In the Swiss ETS, aviation operators significantly increased their use of EU ETS allowances in 2024 (79.6%) compared to 2023 (51.08%). On the other hand, installations used a lower share of the EU ETS allowances for compliance in 2024 (5.19%) compared to 2023 (11.6%). In both years, installations in the Swiss ETS did not use the EU ETS aviation allowances for compliance. In relative terms, EU ETS allowances constituted 31.37% of all allowances surrendered in the Swiss ETS.

Table 10 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. The historical balance shows a net outflow of 1 284 657allowances from the EU ETS to the Swiss ETS. It should, however, be noted that the figures may include re-transfers of these allowances.

Table 8. Units used for compliance in the Union Registry in 2024. Data extracted from the Union Registry on 1 October 2025.

Installations	**Free allocation and auctioning**	**Verified emissions**	**Surrendered units**	**EU ETS allowances**		**Swiss ETS allowances**	
				General	*Aviation*	*General*	*Aviation*
	1 089 612 748	1 033 244 671	1 029 808 309	1 025 571 370	3 428 201	701 150	357 341
	% of the total			99.59	0.31	0.07	0.03
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*
	24 270 111	62 247 419	61 645 450	43 299 227	17 826 613	49 077	470 533
	% of the total			70.24	28.92	0.08	0.76

Table 9. Units used for compliance in the Swiss Registry in 2024. 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*
	3 891 680	3 694 355	3 677 899	191 006	0	3 433 205	53 688
	% of the total			5.19	-	93.35	1.46
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*
	1 118 087	1 990 349	1 990 349	1 301 096	283 515	3 372	402 366
	% of the total			65.3	14.24	0.17	20.22

Table 10. Transfers of allowances between the EU ETS and the Swiss ETS (2020 -2024).

Year	2020	2021	2022	2023	2024	**Total**
Transfer from the EU ETS to the Swiss ETS	475 679	1 051 360	1 714 499	2 603 612	1 591 527	**7 436 677**
Transfer from the Swiss ETS to the EU ETS	0	1 523 770	1 215 662	1 837 292	1 575 296	**6 152 020**
Balance	**1 284 657**					

14. Summary

The report provides a comprehensive summary of the functioning of the EU ETS in 2024 and the first half of 2025. It shows that the system has continued to function well, underpinned by a comprehensive and effectively implemented framework. It also explains any changes to this framework that have taken or will soon take effect, chiefly the cap adjustment for 2026.

Emissions from installations have continued to decrease, driven by an increase in the share of renewables and nuclear in the electricity mix and a reduced reliance on fossil fuels. Thanks to this development, ETS emissions from installations are around 50% below 2005 levels and well on track to achieve the 2030 ETS target.

Further reaching emission reductions in the EU ETS in 2024 have been facilitated by a sustained robust carbon price signal. In ESMA's assessment, the EU carbon market remained stable in 2024 and continued to operate in line with market fundamentals.

ETS revenues have also remained a significant source of funding climate action and energy transformation, with EUR 38.8 billion raised in 2024, distributed primarily to national budgets, alongside 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 230 billion.

Altogether, the report documents the EU ETS functioning as one of the main policy incentives for investment in a clean industrial transition, innovation and modernisation.