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# REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

## on the functioning of the European carbon market in 2022 pursuant to Articles 10(5) and 21(2) of Directive 2003/87/EC

{SWD(2023) 346 final}

List of abbreviations

| | |
|---|---|
| CEF DI | Connecting Europe Facility Debt Instrument |
| CEMS | Continuous Emissions Measurement Systems |
| CORSIA | Carbon Offsetting and Reduction Scheme for International Aviation |
| EEA | European Economic Area |
| EEX | European Energy Exchange |
| EFTA | European Free Trade Association |
| EIB | European Investment Bank |
| ESMA | European Securities and Markets Authority |
| EU | European Union |
| EU ETS | EU Emissions Trading System |
| EU27 | European Union Member States |
| EUTL | European Union Transaction Log |
| ICAO | International Civil Aviation Organization |
| InnovFin EDP | InnovFin Energy Demonstration Projects |
| IOSCO | International Organization for of Securities Commission |
| IPCC | Intergovernmental Panel on Climate Change |
| MSR | Market Stability Reserve |
| NECP | National climate and energy plan |
| NER | New Entrants' Reserve |
| TNAC | Total number of allowances in circulation |

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## 1. Introduction

The European Union's Emissions Trading System (EU ETS) is a cornerstone of its climate policy, designed to bring down emissions cost-effectively. In line with the 'polluter pays' principle, the EU ETS sets a limit and puts a carbon price on emissions from the energy and industrial sectors as well as aviation in Europe, which are responsible for approximately 40% of the EU's total emissions. By drawing on market forces to determine carbon price, the system creates an incentive to reduce emissions where it costs least to do so. In turn, carbon prices determine revenue the EU ETS generates for investment in climate action and energy transformation.

Since its launch in 2005, the EU ETS has helped drive down emissions from electricity and heat generation and industrial production by 37.3%[1], while generating over EUR 152 billion in auction revenue for distribution to Member States. Overwhelmingly, Member States have used this revenue to fund investments in energy transformation and decarbonisation, as well as social measures in support of the green transition. Nevertheless, further emission reductions, including across other sectors, are needed to meet the economy-wide climate targets under the European Climate Law[2]. The EU ETS is critical to achieving this in a cost-efficient manner.

To reach climate neutrality by mid-century, the EU has committed to reducing emissions by 2030 to at least 55% below 1990 levels. In July 2021, the European Commission presented a package of policy reforms, Fit for 55, to deliver this target[3], including a reform of the EU ETS. By June 2023, the European Parliament and Member States in the Council of the EU approved this and other related reforms. Most of the changes to the EU ETS framework will take effect from 2024 onwards.

This report takes stock of the functioning of the EU ETS in 2022 and the first half of 2023 – under the rules before the revision. It recaps major legislative developments, provides an updated insight into key elements of the system's framework and compiles intermittent outcomes of emission trends and auction revenue. The report is presented in line with Articles 10(5) and 21(2) of Directive 2003/87/EC[4] (ETS Directive). It is based mostly on data from the Union Registry, the EU Transaction Log (EUTL) and reports submitted by Member States under Article 21 of the ETS Directive. It is accompanied by a technical document with supplementary information (Staff working document[5]).

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[1] ETS emissions from installations in the power and industry sectors in 2021, 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 29.8.2023.

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

[3] Delivering the European Green Deal, DG Climate Action, 14.7.2021.

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

[5] SWD(2023) 346

## 2. Important legislative developments

In the first half of 2023, important amendments to the EU ETS framework were adopted in the context of the Fit for 55 package and as part of the EU's response to the energy crisis (REPowerEU). This chapter summarises these developments. They will be accounted for in detail in future reports on the functioning of the EU ETS once they take effect.

### 2.1. Reform of the EU ETS in the context of the European Green Deal

The following reforms made as part of the 'Fit for 55' package concern the ETS Directive or related legislation. By the end of June 2023, they had all been adopted.

i. Reform increasing the ambition of the EU ETS – adopted on 10 May 2023[6].

ii. Reform strengthening the Market Stability Reserve – adopted on 19 April 2023[7].

iii. Reform of the EU ETS concerning aviation – adopted on 18 January[8] and 10 May 2023[9].

iv. Reform of the rules of the monitoring, reporting and verification of emissions from maritime transport – adopted on 16 May 2023[10].

v. Reform creating the Social Climate Fund to complement the new emissions trading system for buildings, road transport and small-emitting industry– adopted on 10 May 2023[11].

vi. Reform establishing a Carbon Border Adjustment Mechanism – adopted on 10 May 2023[12].

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[6] Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union and Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading system (OJ L 130, 16.5.2023). See consolidated text.

[7] Decision (EU) 2023/852 of the European Parliament and of the Council of 19 April 2023 amending Decision (EU) 2015/1814 as regards the number of allowances to be placed in the market stability reserve for the Union greenhouse gas emission trading system until 2030 (OJ L 110, 25.4.2023). See consolidated text.

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

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

[10] Regulation (EU) 2023/957 of the European Parliament and of the Council of 10 May 2023 amending Regulation (EU) 2015/757 in order to provide for the inclusion of maritime transport activities in the EU Emissions Trading System and for the monitoring, reporting and verification of emissions of additional greenhouse gases and emissions from additional ship types (OJ L130, 16.5.2023).

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

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

With these reforms, emission reductions under the ETS Directive have been accelerated. In addition, the scope of emissions trading has been expanded to maritime transport under the existing system (see Chapter 3.1) and to buildings, road transport and small-emitting industry through the set-up of the new emissions trading system (ETS 2) from 2027. The EU ETS framework is further strengthened to ensure that the system works smoothly to achieve the higher ambition. At the same time, even more resources from emissions trading have been mobilised to support accelerated, innovation-driven and socially fair decarbonisation – through auction revenue distributed to national budgets, the Innovation Fund and the Modernisation Fund supplied by the EU ETS and the Social Climate Fund. The Social Climate Fund has been created alongside the ETS 2 to mitigate any social effects of carbon pricing in new sectors.

Most changes will take effect from 1 January 2024, yet some apply already. The outcomes of the above-mentioned reforms are elaborated on throughout the report, including the underlying ongoing implementation.

### 2.2. ETS Directive in the context of the REPowerEU Regulation

To address the root causes and impact of the energy crisis triggered by Russia's war of aggression against Ukraine, the Commission put forward the REPowerEU plan[13]. It includes targeted reforms and investments to phase out the EU's dependence on fossil fuel imports from Russia, ensure the security of the energy supply, promote energy efficiency and accelerate the clean energy transformation. To put the plan into action, Parliament and the Council adopted Regulation 2023/435[14] (REPowerEU Regulation) in February 2023.

The REPowerEU Regulation includes mobilising the Innovation Fund as one of the funding sources to implement the plan. Furthermore, it amends the ETS Directive to direct 27 million unallocated allowances from the Market Stability Reserve, which would otherwise become invalid, by 31 December 2030 to replenish the Innovation Fund. This is explained further in Chapters 5 and 8.

## 3. EU ETS coverage

Since 2021, the EU ETS applies in the 27 EU Member States and the European Free Trade Association (EFTA) countries – Iceland, Liechtenstein, and Norway (EU ETS countries) as well as to power plants in Northern Ireland[15]. Since January 2020, the EU ETS is also linked with Switzerland's emissions trading system. How this link works is described in Chapter 13.

The EU ETS covers emissions from electricity and heat generation, energy-intensive industry and aviation in Europe. In 2022, these emissions represented 36% of EU's total emissions – from 8 640 electricity and heat plants and manufacturing installations as well as 390 aircraft operators flying between airports in the European Economic Area (EEA) and from the EEA to Switzerland and the UK. Most installations in the EU ETS emit less than 50 000 tonnes

[13] Communication from the Commission – REPowerEU Plan (COM(2022) 230 final).

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

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

carbon dioxide equivalent ($CO_2$eq) per year[16] (70.7%). Of these, 4 793 are classified as installations with low emissions[17]. Most of the remaining installations emit between 50 000 and 500 000 tonnes $CO_2$eq per year[18] (21.9% of the total), and only a fraction emits over 500 000 $CO_2$eq per year[19] (7.4% of the total). ETS countries reported that 219 installations closed in 2022, 133 of which were due to a reduction of capacity to below 20 megawatts of thermal input. This brings installations below the threshold for coverage under the EU ETS. Figure 1 shows the breakdown of installations in the EU ETS by level of emissions in 2022.

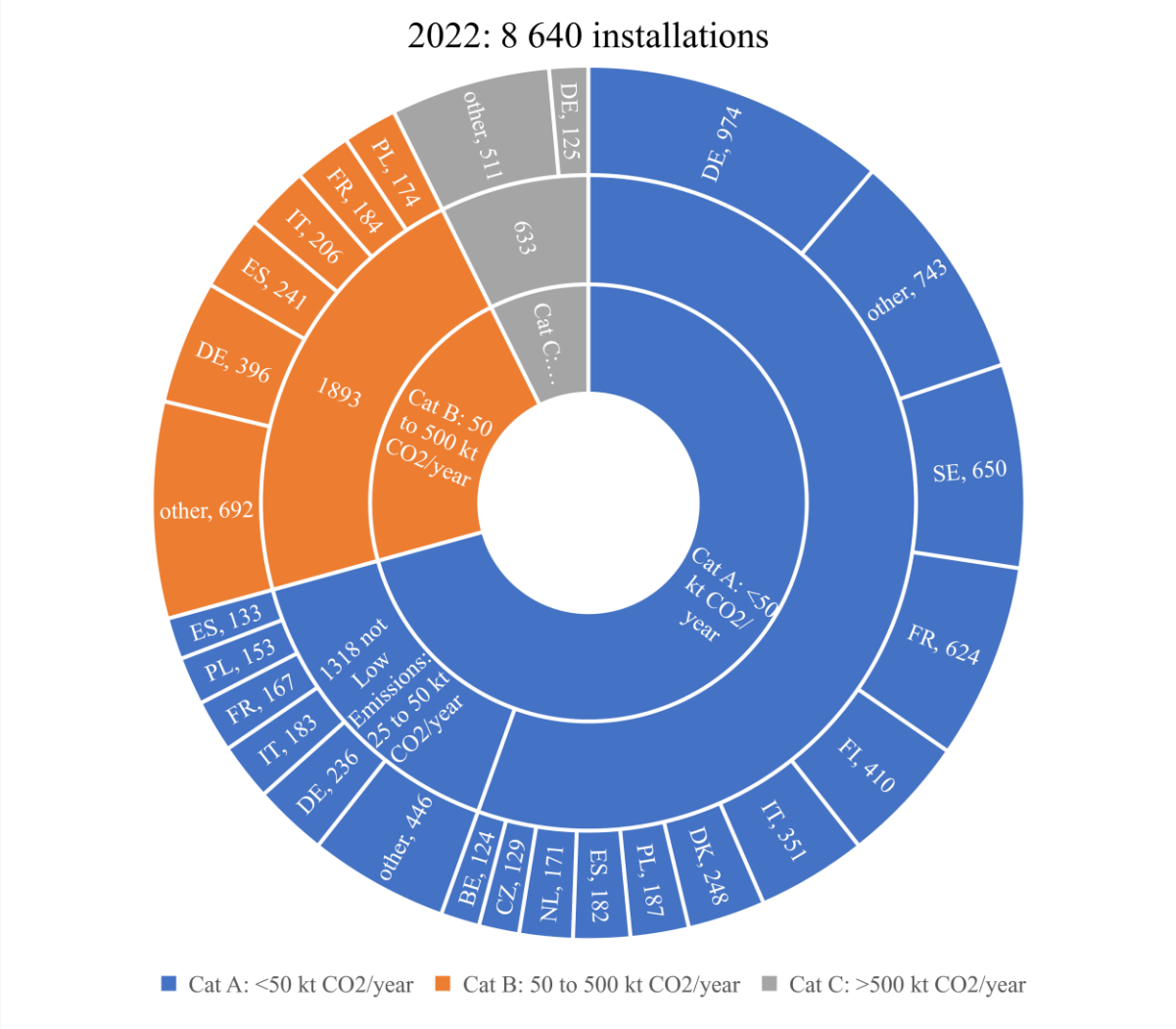



*Figure 1: Number of installations per emissions category in 2022*

To reduce the administrative burden, countries can exclude installations with emissions below 25 000 tonnes $CO_2$eq per year the EU ETS if alternative measures to reduce emissions are put in place[20]. Since 2021, it is also possible to exclude installations from the EU ETS that emit

[16] Category A installations.

[17] A subset within category A installations, with emissions below 25 000 tonnes $CO_2$eq per year.

[18] Category B installations.

[19] Category C installations.

[20] Under Article 27 of the ETS Directive.

less than 2 500 tonnes $CO_2$eq per year[21] as well as reserve or back-up units that do not operate more than 300 hours per year[22]. In 2022, 15 countries opted to exclude installations from the system, accounting for a total of 4.2 Mt $CO_2$eq. This represented 0.32% of emissions from installations included in the EU ETS.

In aviation, most of the 390 regulated operators in 2022 were commercial operators (67% of the total)[23]. A total of 174 operators (45%) qualified as small emitters[24], including 126 of the 129 non-commercial aircraft operators.

In addition to carbon dioxide ($CO_2$) emissions, the EU ETS covers nitrous oxide ($N_2O$) from nitric, adipic and glyoxylic acids and glyoxal production and perfluorocarbons (PFCs) from primary aluminium production. In 2022, 22 countries reported permits for ETS activities releasing non-$CO_2$ emissions. Only Norway declared carbon capture and storage activities. Countries reporting non-$CO_2$ emissions from ETS activities are shown in Table 1 in the Staff working document[25].

### 3.1. Maritime included in the scope of the EU ETS from 2024

Under the revised ETS Directive, the EU ETS will cover greenhouse gas emissions from maritime transport as of January 2024. Initially, it will only concern $CO_2$ emissions and then $CH_4$ (methane) and $N_2O$ emissions from 2026. Emissions from all large ships (of 5 000 gross tonnage and above) entering EU ports are included, regardless of the flag they fly, in respect of:

- 50% of emissions from voyages starting or ending outside the EU (allowing the third country to decide on appropriate action for the remaining share of emissions);
- 100% of emissions that occur between two EU ports and when ships are in EU ports.

Maritime transport is a major emitter of $CO_2$, generating around 3-4% of the EU's total $CO_2$ emissions (over 124 million tonnes of $CO_2$ in 2021) when considering all emissions from voyages to and from the EU[26]. Its inclusion in the EU ETS ensures that the sector contributes to the EU's climate objectives. This will further incentivise energy efficiency, low-carbon solutions, and reductions in the price difference between alternative fuels and traditional maritime fuels.

[21] Under Article 27a (1) of the ETS Directive. In each of the three years before notification to the Commission. Emissions from biomass are excluded.

[22] Under Article 27a (3) of the ETS Directive.

[23] An example of a commercial aircraft operator is a passenger airline providing services to the public. An example of a non-commercial aircraft operator is a privately owned aircraft.

[24] In line with Article 55 of the Regulation (EU) 2018/2066 (see footnote 91).

[25] SWD(2023) 346

[26] Report from the Commission – Fourth Annual Report from the European Commission on $CO_2$ Emissions from Maritime Transport (period 2018-2021), 13.3.2023 (SWD(2023) 54 final).

The system builds on the provisions in place for other EU ETS sectors as well as Regulation 2015/757[27] for monitoring and reporting emissions from maritime transport. The ETS obligations for the maritime sector will be introduced gradually. During an initial phase-in period, shipping will only be obliged to surrender allowances for a portion of their emissions as set out below.

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

This phase-in approach does not undermine the environmental integrity of the EU ETS as, when fewer allowances are surrendered compared to the verified emissions from maritime transport in 2024 and 2025, Member States will cancel a number of allowances corresponding to that difference.

A reporting and review clause is provided for to monitor implementation of the rules applicable to the maritime sector, in particular to detect and address evasive behaviour at an early stage, and assess relevant developments in the International Maritime Organization.

## 4. Cap on emissions

The cap in the EU ETS sets the maximum absolute volume of emissions that regulated entities can emit over a trading phase. It corresponds to the number of allowances issued for that period. The cap decreases annually to ensure that the EU meets its overarching emission reductions target. This also gives regulated entities certainty about the expected scarcity of allowances.

Separate cap calculations apply to emissions from installations and aircraft operators. In 2022, the cap on emissions from installations was 1 528 579 492 allowances. For aviation, 27 268 379 allowances were issued in 2022.

In 2021-2023, the cap has been decreasing at a rate of 2.2% per year. For the cap calculation for installations, this is equivalent to 43 003 515 allowances per year. Table 1 shows the annual figures of the EU ETS cap since 2021.

*Table 1: Annual EU ETS cap figures for installations and aircraft operators*

| Year | Annual cap (installations) | Annual cap (aviation) |
|---|---|---|
| 2021 | 1 571 583 007 | 28 306 545 |
| 2022 | 1 528 579 492 | 27 268 379 |

Under the revised ETS Directive, the cap on emissions is tightened to bring emissions down and in line with the EU's 2030 climate target – by 62% by 2030 compared to 2005. To this

[27] Regulation (EU) 2015/757 of the European Parliament and of the Council on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC (OJ L 123, 19.5.2015).

end, the reduction factor is increased to 4.3% per year in 2024-2027 and 4.4% per year from 2028. In addition, the cap is reduced twice– by 90 million allowances in 2024 and by 27 million allowances in 2026.

These adjustments already recognise that emissions from maritime transport will be included in the EU ETS from 2024. The 2024 cap is increased by 78.4 million allowances based on the sector's average emissions reported for 2018 and 2019. The Commission adopted Decision 2023/1575[28] to take account of the cap adjustments taking effect in 2024.

Figure 2 illustrates changes in the cap throughout all EU ETS phases, including the forthcoming reductions.

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

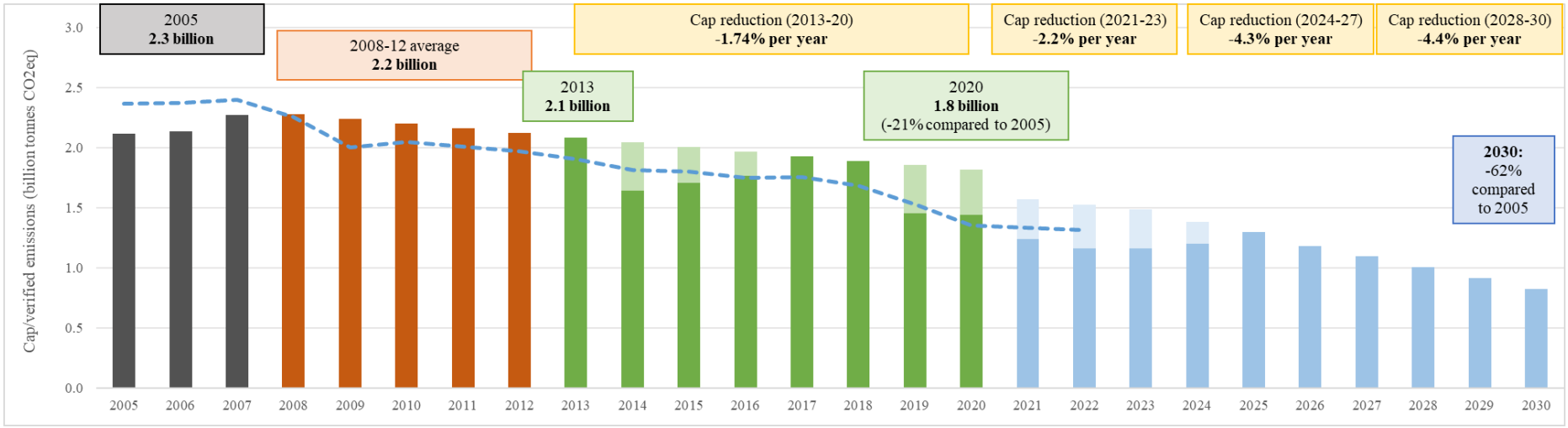



*Figure 2: Emissions cap in the EU ETS compared with verified emissions (considering the 2023 revision of the ETS Directive, i.e. rebasing in 2024 and 2026, including the maritime transport sector in 2024 and the linear reduction factor of 4.3% in 2024-2027 and 4.4% from 2028). Aviation is not included. Due to changes in scope, the 2005-2007 figures are not directly comparable with the latest ones. From 2021, the EU ETS no longer covers installations in the UK, only electricity generators in Northern Ireland. Legend: bars (cap), light shaded bars in 2014-2016 (allowances backloaded from auctions), light shaded bars from 2019 (feeds of allowances to the Market Stability Reserve), dashed line (verified emissions).*

## 5. Auctioning of allowances

Auctioning is the main method of distributing allowances in the EU ETS, accounting for up to 57% of the cap[29]. The Auctioning Regulation[30] 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 2022, auctions continued to take place through the European Energy Exchange AG (EEX):

- as the common auction platform for 25 Member States participating in a joint procurement procedure;
- for Poland, which opted out from the joint procurement procedure but has not yet 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 generators in Northern Ireland.

The EEX also auctioned 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 (1 January 2021 to 30 June 2023)*

| Year | General allowances | Aviation allowances |
|---|---|---|
| 2021 | 582 952 500 | 3 785 500 |
| 2022 | 482 389 000 | 3 698 000 |
| 2023 (until 30 June) | 247 762 000 | 2 326 500 |

In total, 222 auctions were held in 2022, of which two were cancelled. On 1 February, the auction for the common auction platform was cancelled due to a technical problem. In accordance with Article 9 of the Auctioning Regulation, the corresponding volume of allowances was distributed over the subsequent four auctions. On 2 March, the auction for Poland was cancelled as the total volume of bids fell short of the volume of auctioned allowances. That auction was cancelled in accordance with Article 7(5) of the Auctioning Regulation, and the volume was also distributed over the subsequent four auctions. In the first half of 2023, 109 auctions were held. No auctions were cancelled during that period.

[29] 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.

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

From July 2023, auction volumes include allowances allocated from the Market Stability Reserve to the Recovery and Resilience Facility under the REPowerEU Regulation. Allowances auctioned under the REPowerEU Regulation will generate EUR 20 billion for the Facility by 31 August 2026[31].

Figure 3 gives an overview of auction clearing prices in the EU carbon market in 2022 and the first half of 2023. The highest auction price in 2022 of EUR 97.51 was reached on 8 February. The lowest price of EUR 57.91 was recorded on 7 March 2022 during a period of increased market volatility triggered by Russia's full-scale invasion of Ukraine. The average price reached EUR 80.18 in 2022. The price range was narrower in the first half of 2023, between EUR 75.04 (17 January) and EUR 96.33 (28 February).

The auction platform regularly publishes detailed results of each auction on its website[32]. Further information on the performance of auctions, including the participation, cover ratios and prices, can be found in the ETS countries' auction reports [33]

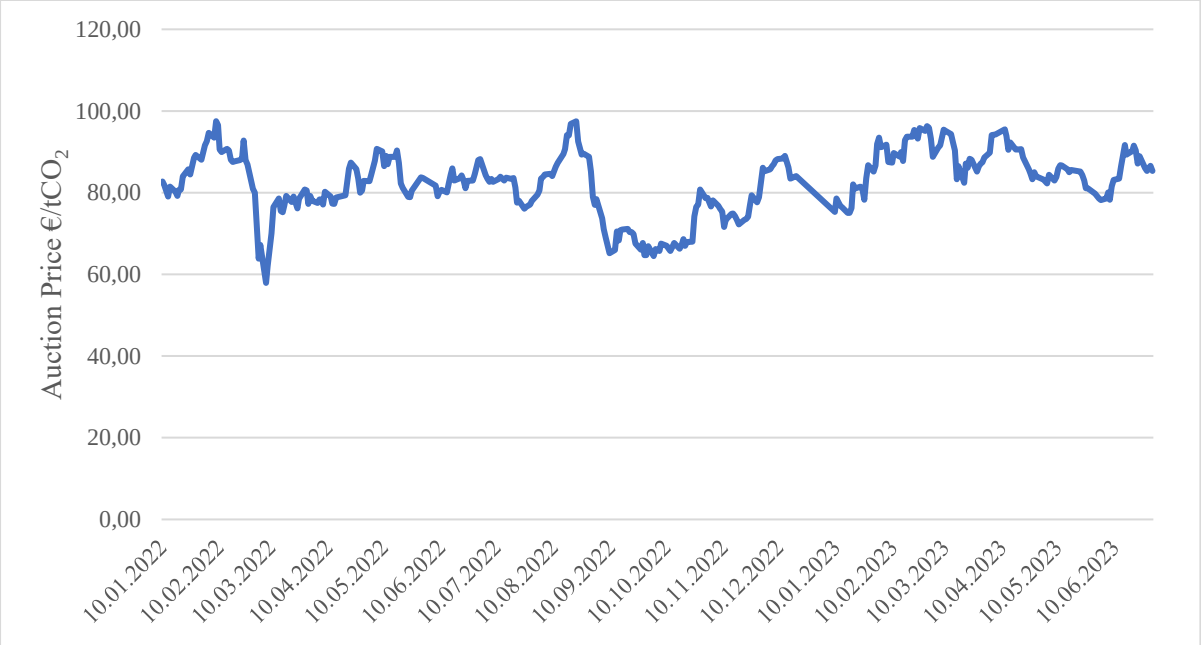



*Figure 3: Clearing prices in auctions of general allowances (1 January 2022 to 30 June 2023)*

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

[32] EEX, EU ETS Auctions.

[33] Auction reports, DG Climate Action, 30.6.2023.

## 6. Free allocation of allowances

While auctioning is the primary method for distributing allowances in the EU ETS, a significant volume of allowances is allocated to regulated entities for free to address the risk of carbon leakage[34]. Free allocation is a transitional measure primarily addressed to the industrial sector.

A dedicated Carbon Leakage List identifies sectors at risk of carbon leakage that are eligible to receive free allocation at 100% of the relevant benchmark levels. The list for 2021-2030[35] identifies 63 sectors and sub-sectors covering about 94% of industrial emissions in the EU ETS.

Free allocation to specific sectors is based on performance benchmarks. These benchmarks reflect an average emissions intensity per unit of product of the most efficient 10% of installations in each sector. Benchmarks are reduced incrementally to increase the incentive for the sector to decarbonise and advance innovation. In 2021, the Commission updated the values of ETS benchmarks[36], which apply in the first allocation period (2021-2025). The benchmarks will be updated for the second allocation period (2026-2030). According to the revised ETS Directive, the annual reduction rates will then be increased to stimulate further industrial transformation: the minimum rate from 0.2% to 0.3% and the maximum rate from 1.6% to 2.5%.

From 2021, volumes of free allocation are adjusted when changes in industrial production occur[37]. The threshold for adjustments is set at a 15% increase or decrease in production. Operators are required to submit annual reports on production data to the relevant national authorities. Based on the data, adjustments may be made to the volume of free allocation issued. This added stringency[38] has led to an increase in the number of annual adjustments to the free allocation volume. The average number of applications submitted in 2021 and 2022 was about 3 600, around three times more than the annual average up to 2020.

Initially, the free allocation for 2021-2025 had been set at 2 791 million allowances for 7 430 installations. With an estimated carbon price of EUR 85/tonne $CO_2$eq, the value of this allocation would amount to about EUR 47 billion every year during this period. By mid-2023, the Commission adopted eight decisions[39] to adjust free allocation volumes, resulting in a

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

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

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

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

[38] Until 2020, the threshold was set at 50% for production decreases while increases were only considered when linked to physical changes expanding the capacity.

[39] The EFTA Surveillance Authority also adopted decisions for Iceland, Liechtenstein and Norway.

reduction of 90.4 million allowances. In parallel, however, the Commission adopted three decisions[40] correcting the initial level of free allocation, adding 3.4 million allowances. This was necessary due to errors found in the data submitted by installations and to implement court rulings. Overall, the free allocation for 2021-2025 has been reduced by 87 million allowances so far compared to the initial decision.

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

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

*Table 3: Free allocation in 2021-2025 (million allowances)*

| **Year** | 2021 | 2022 | 2023 | 2024 | 2025 | Total |
|---|---|---|---|---|---|---|
| **Initial free allocation (EU-27 + Iceland, Liechtenstein, and Norway)** | 559.6 | 558.9 | 558.2 | 557.5 | 556.8 | 2 791.1 |
| **Actual free allocation** | 545.9 | 543.0 | 539.2 | 538.4 | 537.7 | 2 704.1 |
| **Adjusted and corrected free allocation** | −13.7 | −15.9 | −19.0 | −19.1 | −19.1 | −87.0 |

The revision of the ETS Directive aligns free allocation with the strengthened EU ETS. It extends the scope of the activities regulated by the system and of the benchmarks[41] to remove disincentives for deploying new technologies, such as renewable hydrogen or hydrogen-based steel. In parallel, conditions are introduced for accessing free allocation in the form of energy audits and, for certain installations, climate neutrality plans. The implementing rules on free allocation are currently being revised.

In certain ETS sectors (cement, aluminium, fertilisers, hydrogen, iron and steel), free allocation will be gradually replaced by a carbon border adjustment mechanism (CBAM) from 2026. Regulation 2023/956[42] (CBAM Regulation) was adopted as one of the Fit for 55 reforms to mitigate the risk of carbon leakage as the EU ramps up its climate ambition. Importers of products in CBAM sectors will incur a charge for the embedded emissions equivalent to what

[40] The EFTA Surveillance Authority also adopted decisions for Iceland, Liechtenstein and Norway.

[41] Annex I to the ETS Directive – activities in the scope of the EU ETS.

[42] See footnote 11.

EU producers pay under the EU ETS. A transitional period beginning in 2023 gradually introduces the new regime[43]. The revenue from phasing out free allowances for CBAM sectors will be used to increase the Innovation Fund's budget.

## 7. Revenues from emissions trading

The EU ETS generates substantial revenue that is used to advance climate action. This includes financing investments in energy transformation, industrial decarbonisation and technological innovation as well as social measures in support of the green transition. This way, ETS sectors' exposure to the carbon price can also be reduced over time. A higher carbon price leads to higher revenue.

The revenue from auctioning allowances in the EU ETS goes predominantly to Member States' budgets. In addition, a portion of allowances is auctioned and funds the Innovation Fund and the Modernisation Fund. The Innovation Fund succeeded the NER 300 programme, which was funded by the EU ETS up to 2020. Tables 2 and 3 in the Staff working document[44] include a breakdown of the 2022 ETS revenue per EU ETS country and Table 4 shows revenue generated in 2022 for the Innovation Fund and Modernisation Fund. The Staff working document[45] also includes a summary of NER 300 implementation and projects supported through its funds (Table 5).

In 2022, the EU ETS generated a total of EUR 38.8 billion in auction revenue, EUR 7.7 billion more than in 2021. Of this amount, EUR 29.7 billion was distributed directly to Member States[46]. They reported that they spent 76% of this revenue on average on climate- and energy-related projects – the same as in 2021 and in line with the 75% average in 2013-2020. About 25% of Member State revenue is earmarked for specific climate and energy actions, 27% goes to dedicated environmental funds and 48% goes to national budgets. Member States have also continued to use their revenue to address the social impact of the energy crisis. A more detailed overview of Member States' reporting on the use of their ETS revenue in 2022 is available in the 2023 Climate Action Progress Report[47].

Before the latest revision, the ETS Directive required that Member States use at least 50% of their auction revenue[48] and all revenue from aviation allowances for climate- and energy-related purposes. The revised Directive introduces an obligation for Member States to spend all revenue from the EU ETS[49] (or an equivalent amount) on the green transition, including social measures. In the context of the extended scope, Member States are also encouraged to

[43] Commission adopts detailed reporting rules for the Carbon Border Adjustment Mechanism's transitional phase, DG Taxation and Customs Union, 17 August 2023.

[44] SWD(2023) 346

[45] SWD(2023) 346

[46] The remaining difference accounts for the revenues pooled under the Innovation and Modernisation Funds as well as the revenues distributed to Iceland, Liechtenstein and Norway plus the UK in respect of Northern Ireland.

[47] To be adopted; COM(2023) 653 final.

[48] Including allowances distributed for solidarity and growth.

[49] The same obligation will apply to revenue generated from the new ETS 2 for buildings, road transport and small emitting industries when launched.

support the decarbonisation of maritime transport and marine biodiversity protection. The revised spending rules already entered into force on 5 June 2023; next year's report will cover this.

### 7.1. Indirect carbon costs

Member States can grant State aid to certain electricity-intensive industries for carbon costs arising from indirect emissions, specifically from high electricity prices due to energy companies passing on the cost of buying allowances to consumers. The Commission adopted EU ETS State aid guidelines to harmonise implementation of this aid between Member States and minimise competition distortions in the single market. These guidelines first applied to indirect costs incurred in 2013-2020[50]. The guidelines were revised in 2020 to cover 2021-2030[51].

In 2022, Member States paid for indirect costs based on the revised State aid guidelines for the first time. In practice, this means that they had notified schemes for the new period to the Commission for State aid assessment, which were subsequently approved as compatible with the single market.

In contrast to 2021, Lithuania stopped its indirect cost compensation in 2022. However, Slovenia and Austria introduced new schemes, but will only start payments in 2023. This means that in 2022, 13 Member States paid industry for indirect carbon costs that installations incurred in 2021. Portugal can be added to this list, but its scheme was adopted only at the end of 2022, which means that payments occurred later and no data is available yet[52].

Within three months after the end of each year, Member States with an indirect cost compensation scheme in place must publish the total compensation amounts paid out, including a breakdown per recipient sector and subsector. Table 4 summarises the data published by Member States on the compensation paid out in 2022. These compensation amounts are also compared with 2021 auction revenue[53].

[50] Guidelines on certain State aid measures in the context of the greenhouse gas emission allowances trading scheme post-2012 (OJ C 158, 5.6.2012).

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

[52] See State aid case SA.100103. The budget of the Portuguese scheme is EUR 25 million.

[53] Excluding revenues from auctioning aviation allowances.

*Table 4: Amounts paid out in 2022 for indirect costs incurred in 2021*

| Member State | Amount paid for indirect costs incurred in 2021 (million EUR)] | Number of recipients (installations) | Auction revenues in 2021[54] (million EUR) | Share of auction revenues spent on indirect costs |
|---|---|---|---|---|
| Belgium (FL) | 75.2 | 37 | 527.3 | 17.0% |
| Belgium (WL) | 14.2 | 15 | | |
| Czechia | 30.3 | 27 | 601.9 | 5.0% |
| Germany | 806 | 676 | 5 270.9 | 15.3% |
| Greece[55] | 111.6 | 52 | 1 003.9 | 11.1% |
| Spain | 244 | 211 | 2 452.4 | 10.0% |
| Finland | 63.3 | 50 | 404.6 | 15.6% |
| France | 300.2 | 275 | 1 445.9 | 20.7% |
| Italy | 146.8 | 229 | 2 495.8 | 5.9% |
| Luxembourg | 12 | 4 | 7.3 | 176.7% |
| Netherlands | 59.8 | 59 | 894 | 6.7% |
| Poland | 167.6 | 92 | 4 966.4 | 3.4% |
| Romania | 126 | 29 | 480.1 | 26.2% |
| Slovakia | 1 | 7 | 275.8 | 0.0% |

The total indirect cost payments by these 13 Member States in 2022 amounted to around EUR 2.16 billion. This is less than the EUR 2.38 billion disbursed in 2021. The revised ETS Guidelines reduced the number of sectors eligible for compensation. The number of installations that received aid also decreased: from over 2000 in 2021, to around 1750 in 2022. The revised ETS Guidelines also updated the emission factors that Member States use to calculate the maximum aid amount, resulting in lower payments per megawatt hour of benchmarked consumption. On the other hand, the inclusion of the refining sector as well as the introduction of a possibility to limit the maximum own contribution to indirect costs for very electro-intensive industries (i.e., to 1.5 % of beneficiary's gross value added) have the opposite effect of increasing the overall aid amount.

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

[55] Greece's figures are provisional. Given that its compensation scheme was approved only in May 2023, the disbursement exercise had not been finalised yet at the time of reporting.

Under the new schemes implemented by Member States, beneficiaries should re-invest part of the aid in projects that lower their direct or indirect carbon footprint and hence their exposure to carbon leakage risk.

The carbon price used to evaluate indirect costs incurred in 2021 (calculated as the average futures price for that year registered in 2020) was EUR 25.09, almost equal to the EUR 25.20 used for indirect costs incurred in 2020. The compensation schemes typically have a budget calculated for the whole application period (which for most Member States covers 2021-2030).

The indirect cost payments also decreased in relative terms. The total payments for indirect costs in 2022 were 10.4% of 2021 auction revenue collected by the 13 Member States. In 2021, they spent, on average, 19.2% of their auction revenue on indirect carbon costs. Here, the main factor is not the reduced compensation, but the increased auction revenues in 2021 compared to 2020.

Member States that spend more than 25% of their auction revenue on indirect costs in any year are also required to publish a report explaining why they exceeded this threshold. In 2022, most Member States stayed well below this threshold. The increase in auction revenue is also the main driver here. Nevertheless, two Member States spent more than 25% of their auction revenue on indirect cost payments: Luxembourg and Romania.

Luxembourg's expenditure far outweighed its total auction revenue. In large part, this was due to a drop in the country's auction volume caused primarily by its use of ETS allowances for offsetting emissions in the sectors covered by the Effort Sharing Regulation ('ESR flexibility'). The net effect is that Luxembourg received less than half the amount of revenues in 2021 compared to 2020. In absolute terms, Luxembourg's 2022 compensation actually decreased compared to 2021. Romania, by contrast, only slightly exceeded the threshold and explained this was partly the result of the economic recovery, which had led to an increase in industrial production and electricity consumption.

### 7.2. Innovation Fund

Funded entirely by the EU ETS, the Innovation Fund is one of the world's largest funding programmes for deploying low- and zero-carbon innovative solutions and technologies in energy, industry and net-zero mobility. The Fund provides grants for projects aimed at commercially deploying innovative low-carbon technologies and bringing to market industrial solutions to decarbonise Europe and support the transition to climate neutrality.

The Commission reports in more detail on implementation of the Innovation Fund separately. The second Progress Report on implementation of the Innovation Fund is expected in Q4-2023[56].

In terms of concrete results so far, 16 large-scale and 16 small-scale projects signed grant agreements following the second round of calls for proposals concluded in 2022. Over EUR 1.8 billion will fund innovation, including in the cement, hydrogen, chemicals and manufacturing

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

sectors, and advance decarbonisation in eight ETS countries[57]. About EUR 60 million will fund small-scale innovation in several hard-to-abate sectors, including glass, cement, energy storage and renewables[58].

With projects awarded support in Czechia, Slovenia, Lithuania and Cyprus, the sectoral and geographical balance of the Innovation Fund improved. By June 2023, the total Innovation Fund portfolio counted 69 projects under implementation with an ETS contribution of EUR 3.1 billion[59]. When completed, it is estimated that these projects will save around 215 Mt $CO_2$eq of emissions in their first 10 years of operation.

The incentive from the EU ETS carbon price for these projects is much larger than the amount of Innovation Fund-sourced funding. For example, the carbon price benefit to companies' business cases from the projects supported by the Innovation Fund so far is around EUR 17.3 billion (carbon costs avoided due to lower emissions). This incentive clearly exceeds the Innovation Fund support for these projects of EUR 3.1 billion. This reflects the EU ETS logic whereby carbon price is the main long-term incentive, while the Innovation Fund supplements this incentive to accelerate change[60].

In parallel, 18 unsuccessful projects from the second round of calls (both large- and small-scale) were selected for project development assistance under the Innovation Fund. This support amounts to EUR 6.87 million and is provided by the European Investment Bank (EIB). Since the beginning of the programme, 43 projects have been awarded project development assistance, creating a strong pipeline of future good quality applications.

The third call for large-scale projects focused specifically on areas linked to the EU's REPowerEU plan. In July 2023, 41 projects[61] were pre-selected to prepare grant agreements for an unprecedented Innovation Fund contribution of EUR 3.6 billion. The agreements are expected to be signed by the end of 2023. The third small-scale call, with a budget of EUR 100 million closed on 19 September 2023 with 72 proposals received..

The revision of the ETS Directive brings important changes to the Innovation Fund. The Fund is increased from 450 to around 530 million allowances, the sale of which is expected to pool about EUR 40 billion in revenue available until 2030[62]. More sectors are included in the scope of the Fund - maritime, buildings and road transport. Also, new elements are introduced in the Fund's coverage to better align it with market needs, including a category of medium-scale projects and funding mechanisms such as competitive bidding procedures (auctions). While the Fund remains focused on breakthrough innovation, it is expanded to scaling up innovative technologies and the auctions should aid this. In view of the revision, the Innovation Fund

[57] The projects will contribute to the decarbonisation efforts of six Member States (Bulgaria, France, Germany, the Netherlands, Poland, and Sweden), plus Iceland and Norway.

[58] 16 grants from the EU's Innovation Fund awarded to projects across Europe, DG Climate Action, 6 June 2023.

[59] Updated portfolio of projects signed under the Innovation Fund.

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

[61] EU invests €3.6 billion of emissions trading revenues, DG Climate Action, 13 July 2023.

[62] At an estimated carbon price of EUR 75/tonne of $CO_2$.

Regulation 2019/856[63] has undergone an amendment. It is expected to enter into force at the beginning of November 2023.

The fourth call for proposals, covering small-, medium- and large-scale projects, with a tentative budget of EUR 4 billion as well as the first auction for renewable hydrogen with a budget of EUR 800 million will be launched before the end of 2023, under the revised rules. The pilot auction and the following one are open to Member States to assign to them national budgets in order to support additional projects – this is the concept of 'Auction as a Service' outlined in the European Hydrogen Bank Communication[64].

### 7.3. Modernisation Fund

The Modernisation Fund is a solidarity programme financed from the EU ETS. It supports 10 lower-income Member States[65] and from 2024, 13 lower-income Member States in meeting the 2030 climate and energy targets by helping deploy projects that modernise energy systems and improve energy efficiency. Its budget comes from auctioning a share of the EU ETS cap; it is allocated between the beneficiary Member States according to a fixed key[66].

Member States submit investment proposals they select to be assessed by the European Investment Bank. They are, however, required to use most of their resources under the Fund on priority investments that help advance their energy transformation. The Commission takes a disbursement decision once an investment is confirmed as a priority by the EIB or recommended 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.

Total disbursements from the Modernisation Fund since January 2021 amount to around EUR 7.5 billion, benefiting all eligible Member States. Table 5 presents the amounts disbursed per Member State. In June 2023, the Commission adopted the fifth disbursement decision[67] under the Modernisation Fund. On this basis, the EIB made payments for a total of EUR 2.4 billion to seven beneficiary Member States[68] to finance 31 investment proposals. Submissions

[63] Commission Delegated Regulation (EU) 2019/856 of 26 February 2019 supplementing Directive 2003/87/EC of the European Parliament and of the Council with regard to the operation of the Innovation Fund (OJ L 140, 28.5.2019).

[64] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – European Hydrogen Bank, 16.3.2023 (COM(2023) 156 final).

[65] The first beneficiary Member States were Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovakia. Greece, Portugal and Slovenia were added in the 2023 revision of the ETS Directive.

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

[67] Commission Decision of 30.5.2023 on the disbursement of revenues from the Modernisation Fund under Directive 2003/87/EC of the European Parliament and the Council - First biannual disbursement cycle of 2023 (C(2023) 3643 final).

[68] The fifth disbursement decision under the Modernisation Fund authorised payments to Romania (EUR 1.1 billion), Czechia (EUR 1 billion), Bulgaria (EUR 197 million), Poland (EUR 47 million), Croatia (EUR 88 million), Latvia (EUR 5 million) and Lithuania (EUR 1 million).

for another round of proposals under the Modernisation Fund closed on 15 August 2023 for non-priority projects and on 12 September 2023 for priority projects.

*Table 5: Total disbursements from the Modernisation Fund (1 January 2021 to 30 June 2023)*

| Beneficiary Member State | Disbursed amounts since 2021 (million EUR) |
|---|---|
| Bulgaria | 196.6 |
| Czechia | 2 677.2 |
| Estonia | 87.0 |
| Croatia | 210.0 |
| Hungary | 108.6 |
| Lithuania | 114.0 |
| Latvia | 5.0 |
| Poland | 1 036.2 |
| Romania | 2 558.2 |
| Slovakia | 519.5 |
| TOTAL | **7 512.2** |

The revision of the ETS Directive brings important changes to the Modernisation Fund's size and governance. The size of the Fund is increased with 110 million allowances added to the original 640 million. This top-up is shared between 13 beneficiary Member States – the 10 original beneficiaries plus Greece, Portugal and Slovenia. Even more ETS resources under the Fund are allocated to priority resources, while the list of priorities is broadened. In view of the revision, the Modernisation Fund Regulation 2020/1001[69] is being amended. It is scheduled for adoption in Q4 2023. The amended Regulation would enter into application on 1 January 2024, for the new rules to apply already in the first disbursement cycle that year.

## 8. Emission reductions in the EU ETS

In 2022, overall emissions in the EU ETS amounted to 1 362.1 million tonnes $CO_2$eq (down from 1 364.9 million tonnes $CO_2$eq in 2021). Emissions from installations accounted for 1 313 million tonnes $CO_2$eq, 1.8% less than in 2021. Emission reductions were driven mainly by industry installations (−6.5% in 2022). Emissions from electricity and heat generation

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

increased for the second year in a row (+2.4% in 2022). This was mainly due to the energy crisis in Europe and the subsequent higher use of fossil fuels in electricity generation.

Emissions from industrial installations fell by 6.5% in 2022 compared to 2021. Significant decreases could be observed in the production of cement clinker, pig iron or steel, bulk chemicals, lime and the calcination of dolomite/magnesite and ammonia. An increase in emissions could be seen in the mineral oil refining sector. Table 66 shows the trend in ETS emissions from installations in recent years.

*Table 6. Verified emissions from installations in the EU ETS [million tonnes].*

| **Year** | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| **Verified emissions from stationary installations** | 1 530 | 1 356<br>(1.253 UK excluded) | 1 337 | 1 313 |
| **Change year-on-year** | −9.1% | −11.4% | −1.4%<br>(6.6% UK excluded) | −1.8% |
| **Verified emissions from electricity and heat generation** | 822 | 696<br>(653 UK excluded) | 708 | 725 |
| **Change year-on-year** | −14.7% | −15.3% | 1.6%<br>(8.4% UK excluded) | 2.4% |
| **Verified emissions from industrial production** | 708 | 660<br>(601 UK excluded) | 629 | 588 |
| **Change year-on-year** | −1.6% | −6.9% | −4.7%<br>(4.6% UK excluded) | −6.5% |

Figure 4 and Figure 5 illustrate the trend in emissions from fossil fuel combustion by EU ETS installations – in total and by fuel type, respectively. Altogether, emissions are on a downward trend. However, the long-term trend of hard coal replacement by natural gas reversed in 2022, linked to the high increase in the price of natural gas. Biomass emissions are not covered under the EU ETS; thus, they are not included in the emission values in the other sections of this report. The figure also shows a trend of an increasing use of biomass by ETS installations, with 16.7% on top of the ETS installation emissions in 2022. Until 2022, emissions from the combustion of biomass were generally zero-rated.

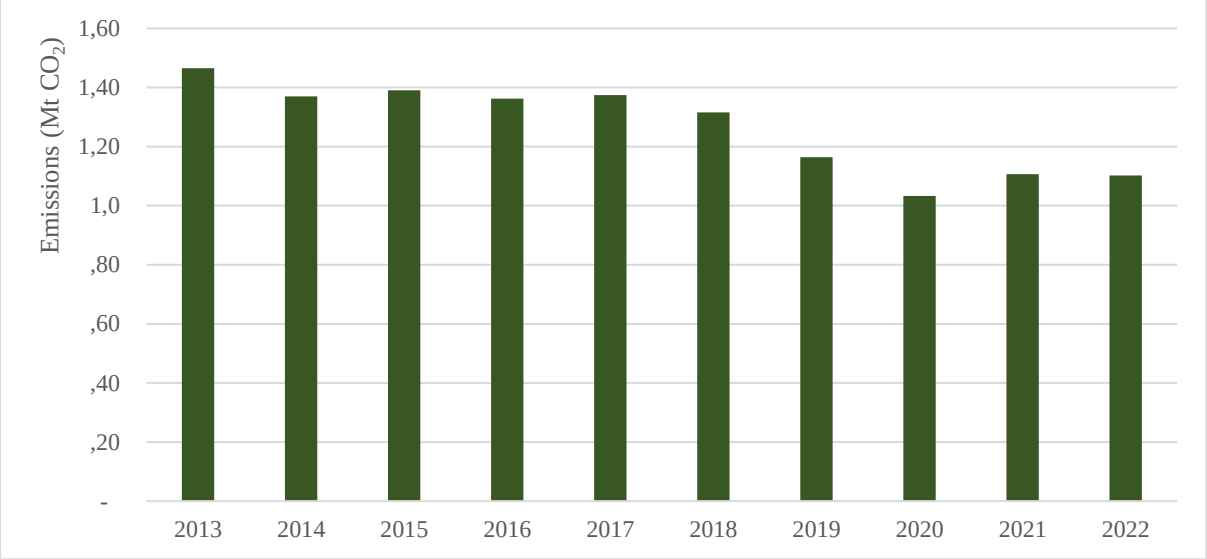



*Figure 4: Trend in total emissions from fossil fuel combustion in the EU ETS*

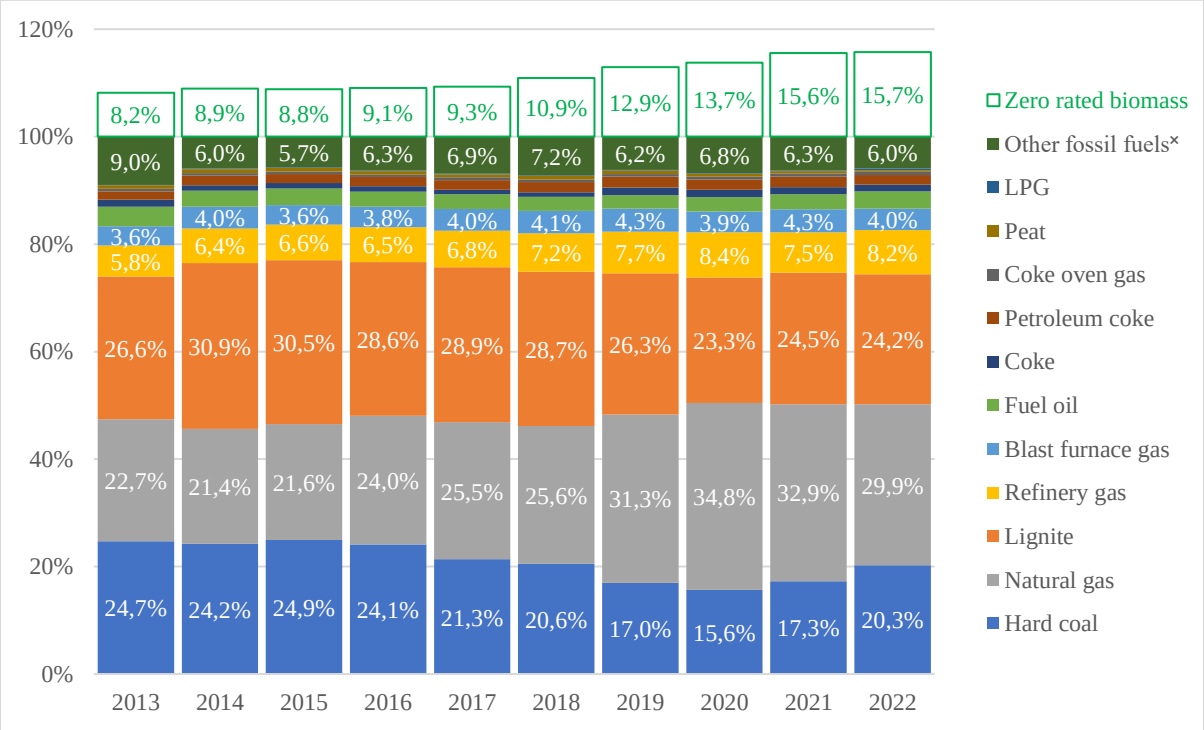



*Figure 5: Trend in the share of emissions of each fuel type (% of total fuel emissions in ETS installations, labels not shown if fuel never reaches a share above 3% of the total)*

*[*] not covered by the other specified fuels*

From 1 January 2023[70], new sustainability and emissions savings criteria under the Renewable Energy Directive[71] apply to emissions from zero-rated biomass in the EU ETS. They include stricter criteria on biofuels and bioliquids and new criteria for solid and gaseous biomass.

Biomass fuels that meet the applicable sustainability criteria and greenhouse gas savings criteria or that are not covered by these criteria can be considered zero-rated. This means that their $CO_2$ emissions do not count as fossil $CO_2$. Operators do not need to surrender ETS allowances for these zero-rated emissions. Therefore, in Figure 5, the zero-rated biomass emissions are shown on top of the fossil fuel emissions.

Figure 6 demonstrates how zero-rated emissions from biomass are split between Category A, B, and C installations in the EU ETS. The split excludes the absorption phase and the net value of emissions. The zero-rated emissions from biomass were 173 Mt $CO_2$eq, in 2022, and similar to the previous year.

Emissions from non-zero-rated biomass remained minimal at around 1.3 Mt $CO_2$eq, accounting for just under 0.1% of total ETS emissions from stationary installations. Whilst this is almost the same share as in 2021, it is expected to increase due to the requirements for zero-rated biomass becoming stricter, particularly after 2023. Until 1 January 2023, national authorities may allow installations to zero-rate emissions from biomass without demonstrating compliance with the Renewable Energy Directive II criteria for sustainability and emissions savings.

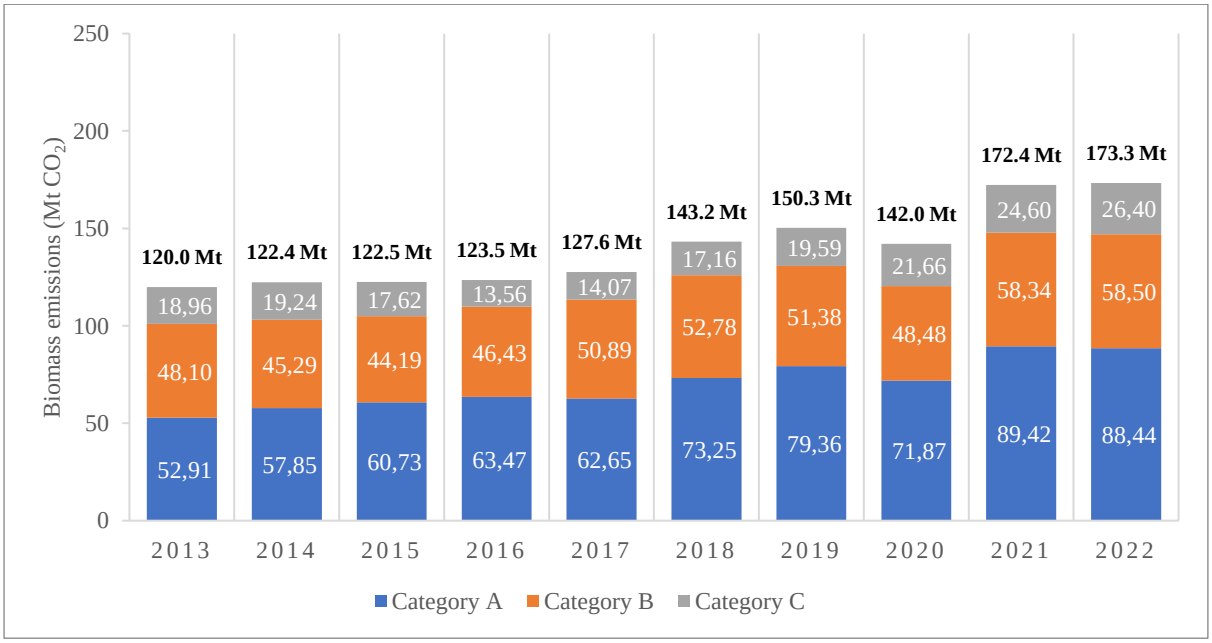



*Figure 6: Annual emissions of ETS installations, originating from zero-rated biomass, from 2013 to 2020 (million tonnes $CO_2$eq)*

[70] Article 38(6) of the Monitoring and Reporting Regulation. As above, Regulation (EU) 2018/2066 amended in 2020 by Regulation (EU) 2020/2085 and in 2022 by Regulation (EU) 2022/388. See consolidated text.

[71] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast) (OJ L 328, 21.12.2018). See consolidated text.

## 9. Balancing supply and demand in the EU carbon market

The Market Stability Reserve (MSR) was created as a rule-based, long-term solution to a structural imbalance between the supply of and demand for allowances in the EU ETS at the start of phase 3. In 2013, the EU carbon market had a surplus of 2.1 billion allowances (after providing for the use of 1.6 billion international credits for compliance in the EU ETS).

The MSR adjusts the supply of allowances in the EU ETS 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[72] from auctions and placed in the Reserve or released from the Reserve and auctioned. This way, the MSR fosters balance and resilience to future supply-demand shocks, allowing the EU carbon market to function smoothly. The Reserve began operating in 2019 and has since withdrawn allowances from circulation.

The Commission publishes the TNAC annually. It is calculated for the preceding year, while the supply adjustments follow the publication over a 12-month period and according to a specific key. On 15 May 2023, the Commission published the Communication on the TNAC in 2022[73]. It totalled 1.13 billion allowances – a decrease compared to 2021 yet still above the threshold activating the Reserve. As a result, 272 million allowances (24% of the TNAC) are being withdrawn from auctions from September 2023 to August 2024. Figure 7 illustrates the trend in the surplus of allowances in the EU ETS since 2013. ETS countries' contributions to the MSR since 2019 are presented in the Table 6 in the Staff working document[74].

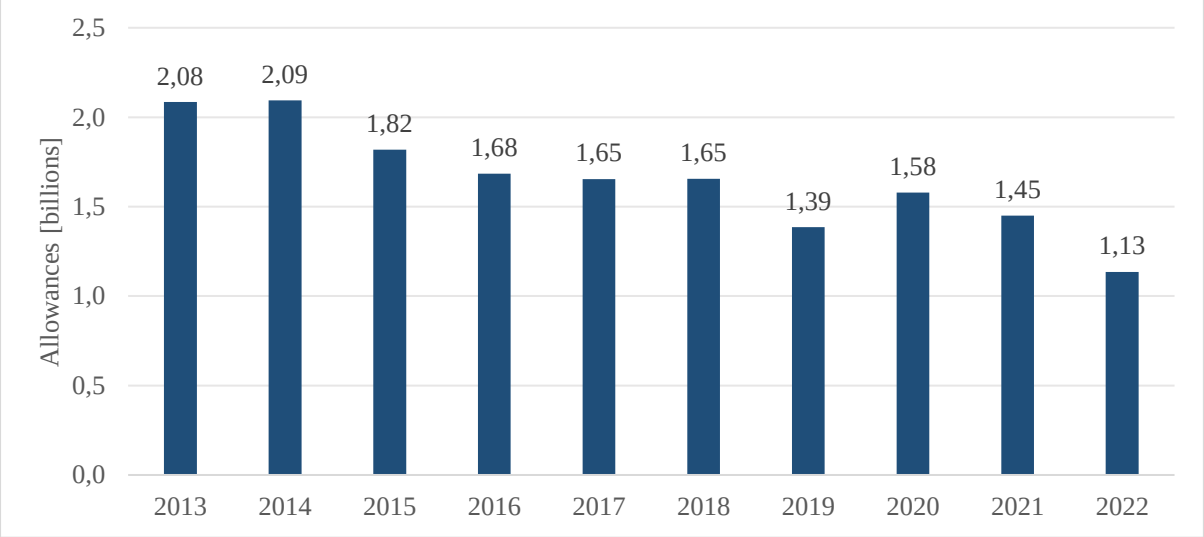



*Figure 7: Surplus of allowances in the EU ETS (2013-2022)*

As of 2023, the MSR invalidates allowances in its holdings above a certain threshold[75]. The Commission reported on this in the Communication on the TNAC in 2022. The applicable

[72] The MSR withdraws 24% of the TNAC when it exceeds 833 million allowances.

[73] Communication from the Commission Publication of the total number of allowances in circulation in 2022 for the purposes of the Market Stability Reserve under the EU Emissions Trading System established by Directive 2003/87/EC (OJ C 172, 15.5.2023).

[74] SWD(2023) 346

[75] Under Article 1(5a) of the MSR Decision.

threshold was the 2022 auction volume (486 million allowances). On 31 December 2022, the MSR contained over 3 billion allowances. As a result, 2.5 billion allowances became invalid on 1 January 2023. The remaining allowances correspond to those placed in the Reserve via its intakes since 2019. From this remaining volume, 27 million allowances were taken under the REPowerEU Regulation to be auctioned to supply the Innovation Fund. The calculation of the TNAC in 2023 will reflect this.

Important changes have been made to strengthen the Reserve as part of Fit for 55 – in the revision of the ETS Directive and the MSR Decision. They will take effect in 2024. Chiefly, the MSR intake rate of 24% is maintained and the invalidation threshold is fixed at 400 million allowances. The intake rate mechanism is also adapted to mitigate threshold effects. When the TNAC is between 833 and 1 096 million allowances, the intake rate mechanism will not be activated; instead, a smaller share of allowances will be deducted from auction volumes and placed in the Reserve. Furthermore, from 2024, the net demand from aviation will be included in the TNAC calculation. The Communication on the TNAC in 2023 will account for these changes. It is due to be published by 1 June 2024.

## 10. Aviation

The EU ETS has regulated emissions from the aviation sector since 2012. Legally, the system covers all outgoing flights and all incoming flights to the EEA. In 2013, however, the EU temporarily limited ETS obligations 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)[76]. The ETS Directive coverage has been extended three times since, as explained below.

First, as of 1 January 2020, the EU ETS covers emissions from outgoing flights to Switzerland[77]. The Swiss ETS applies to flights departing to EEA airports. This ensures a level playing field in both route directions. Second, as of 1 January 2021, the EU ETS applies to outgoing flights to the UK. The UK ETS applies to flights departing to EEA airports, which maintains the carbon pricing coverage of aviation emissions despite the UK's departure from the EU.

The third scope extension will take place on 1 January 2024 when emissions from most flights[78] to and from the EU's nine outermost regions will be covered by the EU ETS as well as departing flights from the outermost regions to Switzerland and the UK. Altogether, this will lead to an extension of ETS carbon pricing coverage of around 7%. Switzerland is also planning to cover emissions from flights departing to the outermost regions in its ETS from the same date.

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

[77] Adjusted verified emissions, excluding incoming flights incoming from the UK: 21.5 Mt in 2020 and 55.8 Mt in 2019.

[78] 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.

In 2022, around 27 million aviation allowances were issued in line with the updated scope of the EU ETS. Free allocation amounted to 23.1 million allowances. Aircraft operators administered by national administrators in the EEA received a little less than 0.4 million Swiss aviation allowances for free under the Swiss ETS. Approximately 3.7 million aviation allowances were auctioned in 2022.

Emissions from aircraft operators increased significantly in 2022 compared to 2021. In 2022, emissions amounted to 49.1 million tonnes (including 0.5 million tonnes under the Swiss ETS), up from 27.9 million tonnes in 2021. This was still almost 30% lower than the 68.2 million tonnes emitted in 2019. Since 2021, however, the EU ETS no longer covers incoming flights from the UK. Without these, the EU ETS aviation emissions are closer to 2019 levels, confirming the return to pre-COVID 19 emission levels[79].

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.

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

*Table 7: Aviation in the EU ETS – verified emissions, volumes of allowances allocated for free and auctioned*

| **Year** | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| **Verified emissions (million tonnes $CO_2$eq)** | 68.2 | 25.2 | 27.9 | 49.1 |
| **Change year-on-year**[80,81] | 1% | −63% | 30% | 75% |
| **Free allocation (EU27 + Iceland, Liechtenstein, and Norway + UK + Switzerland)** [82,71,72] | 31.3[83] | 32.5 | 24.0 | 23.1 |
| **Free allocation from the special reserve for new entrants and fast-growing operators** | 1.0 | 0.8 | 0.3 | 0.25 |
| **Volumes of allowances auctioned** | 5.5 | 9.2 | 3.8 | 3.7 |

The ICAO Assembly adopted a resolution on the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) in October 2016. This resolution was reconfirmed in the 2019 and 2022 revisions. Its main objective is to offset $CO_2$ emissions from international aviation above a certain baseline. The scheme launched in 2021 and is voluntary for all states until 2026. As of 2027, it should be no longer voluntary for major aviation countries. It is not yet clear if all obliged countries will apply it after that – some have expressed reservations about the scheme (e.g., China)[84]. Participating states should oblige airlines based in those countries to offset their emissions above a baseline set at 85% of 2019 levels by purchasing and cancelling international credits. To facilitate progress at ICAO the limitation of the intra-European scope of the EU ETS for aviation was extended until the end of 2026 as third

[80] Considering the updated scope of aviation in the EU ETS (without incoming flights from the UK).

[81] Switzerland included in 2020, 2021 and 2022 data only.

[82] 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.

[83] 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.

[84] Impact assessment report accompanying the Proposal for a Directive of the European Parliament and the Council amending Directive 2003/87/EC as regards aviation's contribution to the Union's economy-wide emission reduction target and appropriately implementing a global market-based measure (SWD(2021) 603, 14.7.2021, p.9).

countries should be applying CORSIA from 2027. Furthermore, the EU ETS revision sets out that the system will apply to flights involving countries that do not apply CORSIA as of 2027.

The revised ETS Directive advances the implementation of the polluter pays principle in the aviation sector. Free allowances for aircraft operators will be gradually phased out by the end of 2025. At the same time, 20 million allowances (with an estimated current market value of around EUR 1.6 billion) are earmarked to further support the uptake of eligible alternative fuels. This would increase the existing incentive the EU ETS gives to alternative fuels over fossil fuels, where zero rating gives a financial incentive of around EUR 300 per tonne of fuel. The ongoing revision of the Energy Taxation Directive is expected to increase this incentive further.

Recognising that non-$CO_2$ aviation effects can no longer be ignored[85], a dedicated monitoring, reporting and verification (MRV) framework has been introduced and will start on 1 January 2025. The Innovation Fund has been expanded to support reducing the overall climate impact of aviation. Based on the results of the MRV of non-$CO_2$ aviation effects, the Commission will submit a report by the end of 2027. It will then, where appropriate, draft a legislative proposal, with an accompanying impact assessment, setting out how to mitigate those effects by expanding the scope of the EU ETS for aviation to non-$CO_2$ effects.

In 2026, the Commission will assess if CORSIA has been strengthened and if it is being implemented by major countries outside Europe. Based on the outcome of this assessment, the Commission should either make a legislative proposal to: (i) limit the scope of EU ETS to flights departing EEA airports, with the deduction of any costs incurred from CORSIA offsetting on these routes, and exempt incoming flights; or (ii) only apply ETS carbon pricing to intra-European flights and routes involving countries that do not apply CORSIA from 2027.

## 11. Market oversight

The EU carbon market is subject to robust market oversight rules enshrined in EU financial markets. Both spot and derivatives in emissions allowances are classified as financial instruments under Directive 2014/65/EU[86]. 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[87], under the coordination of the European regulator, the European Securities and Markets Authority (ESMA). They monitor market participants' behaviour through extensive reporting

[85] The overall impact of global aviation on climate is considerably higher than the $CO_2$ component alone, which the EU ETS currently regulates. 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.

[86] Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU (OJ L 173, 12.6.2014).

[87] The list of national competent authorities responsible under the Market Abuse Regulation can be found on ESMA's website.

and transparency requirements. In addition, Regulation 596/2014[88] on market abuse obliges market participants to report suspicious orders and transactions immediately. National authorities in turn have the power to respond with remedial action or penalties if they identify market abuse.

In the light of the energy crisis and ETS price rise, ESMA published an in-depth inquiry into the functioning of the EU carbon market on 22 March 2022[89]. The report provided a detailed analysis of the market, concluding that it functioned properly and that price movements were in line with market fundamentals. In addition, ESMA proposed several recommendations to further improve the transparency and integrity of the EU carbon market.

Furthermore, the Commission conducted a market survey on the participation of operators in auctions and secondary markets in the second half of 2022. The survey, to which more than 900 operators responded, confirmed the important role of financial entities in the orderly functioning of the EU carbon market. Overall, operators were positive about the current set-up for acquiring emission allowances through auctions and secondary market trading. Most operators use financial intermediaries to acquire emission allowances and comply with their obligations. The main reasons operators give for using intermediaries are the limited need for allowances, cost efficiency and a limited knowledge of financial markets.

Against this background, the revised ETS Directive includes several amendments to further improve the EU carbon market's transparency. ESMA has been requested to conduct a periodic assessment of the functioning of EU carbon markets and include it in their regular report on trends, risks and vulnerabilities in financial markets. On 31 August 2023, ESMA reported in its second Report on trends, risks and vulnerabilities of 2023 that the EU carbon market remained stable in 2023 and continued to operate in line with market fundamentals.

As part of the EU ETS reform, the Commission also committed to introducing several changes in the EU ETS implementing legislation to further improve the carbon market's transparency. These changes, amending the Auctioning Regulation and Registry Regulation, are in line with recommendations of the ESMA report. To facilitate market monitoring, national competent authorities and ESMA will receive detailed data for each auction and will be allowed to have regular access to Union Registry data. Furthermore, changes will be made to facilitate the identification of purely bilateral transactions in the Union Registry. The work on amending the Auctioning and Registry Regulations to implement these commitments is ongoing.

On 5 July 2023, the International Organization of Securities Commission (IOSCO) published its report on compliance carbon markets[90]. It is an international body that brings together the world's securities regulators and is recognised as the global standard setter for the securities sector. The report, based upon the lessons learned from the existing compliance carbon markets

[88] Regulation (EU) No 596/2014 of the European Parliament and of the Council of 16 April 2014 on market abuse (market abuse regulation) and repealing Directive 2003/6/EC of the European Parliament and of the Council and Commission Directives 2003/124/EC, 2003/125/EC and 2004/72/EC (OJ L 173, 12.6.2014).

[89] ESMA70-445-38, ESMA Final report on emission allowances, 28.3.2022.

[90] FR09/23 - Compliance Carbon Markets, IOSCO, Final Report, 5.7.2023.

and good practices in commodity derivatives markets, assessed both primary and secondary markets spot as well as derivatives trading across jurisdictions.

The IOSCO report points to best practices applicable in the EU carbon market. These include the Market Stability Reserve to limit the risk of oversupply of allowances, the classification of emission allowances and derivatives as financial instruments, the application of a comprehensive market oversight framework to commodities markets including rules on transparency and transaction reporting, market abuse, anti-money laundering and effective supervision by competent authorities. The report makes 12 recommendations to assist jurisdictions in setting up compliance carbon markets, broadly in line with the current regulatory framework governing the EU carbon market.

# 12. Framework for the monitoring and reporting of emissions

A smoothly functioning and environmentally credible EU ETS is ensured through a robust framework of monitoring, reporting, verification and accreditation requirements. These requirements are harmonised in Regulation 2018/2066 (Monitoring and Reporting Regulation)[91] and Regulation 2018/2067 (Accreditation and Verification Regulation)[92]. Every year, countries report on implementation of these Regulations and the ETS Directive.

## 12.1. Monitoring and reporting

The system to monitor emissions in the EU ETS relies on a building-block approach. It gives operators a high degree of flexibility thus ensuring both the cost-efficiency and reliability of emissions data. Operators may use several monitoring methods ('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 methods and temporal variations. In 2022, five ETS countries[93] continued to allow installations to use simplified monitoring plans in low-risk cases[94]. For aviation, only Belgium reported using this provision for operators with low emissions.

[91] As above, Regulation (EU) 2018/2066 amended in 2020 by Regulation (EU) 2020/2085 and in 2022 by Regulation (EU) 2022/388. See consolidated text.

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

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

[94] Pursuant to Article 13 of the Monitoring and Reporting Regulation (Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 601/2012 (OJ L 334, 31.12.2018). The Regulation was amended in 2020 by Commission Regulation (EU) 2020/2085 and in 2022 by Commission Regulation (EU) 2022/388. See consolidated text).

The legal requirements for emission monitoring are effectively met by most installations. Most installations used the calculation-based methodology[95] to calculate their emissions. Only 145 installations (1.7%) in 22 countries reported using continuous emissions measurement systems (CEMS), nine installations fewer than in 2021. Of these, 91 installations used CEMS to measure $CO_2$ emissions, 45 for $N_2O$ and 9 for both gases. CEMS is used most frequently in Germany and Czechia. In 34 installations, the measured emissions also contained biogenic $CO_2$. Of the installations using CEMS, 69 used the methodology for more than 95% of their emissions, the other 76 used a combination of CEMS and a calculation-based methodology.

Only 11 countries reported using the fall-back approach; this was used for 27 installations covering approximately 2.6 million tonnes $CO_2$eq (4 fewer installations than in 2021 but 0.16 million tonnes $CO_2$eq more in emissions' terms). One installation in the Netherlands is responsible for 60% of the overall emissions reported using the fall-back methodology due to its complex set-up.

Most installations met the minimum required tier defaults[96] of the Monitoring and Reporting Regulation in 2022. Only 96 category C installations (up from 89 in 2021) were reported to have deviated in at least one parameter from the requirement to apply the highest tiers for major source streams. They were located in 17 different countries (down from 18 in 2021) and represented 15.1% 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.

The Monitoring and Reporting Regulation has been amended to the take the revised ETS Directive into account[97]. The updated rules will apply as of 1 January 2024 when the next monitoring cycle begins. Among other, they reflect one new development under the revised ETS Directive – that installations for the incineration of municipal waste will begin to monitor and report their emissions under the EU ETS from 2024. The second revision of the Regulation with additional amendments will start towards the end of 2023.

### 12.2. Accreditation and verification

Verifiers of emissions monitoring in the EU ETS must be accredited by a national accreditation body to carry out assessments in compliance with the Accreditation and Verification Regulation. Accredited verifiers can operate with mutual recognition across all EU ETS countries, taking full advantage of the single market and ensuring sufficient service availability.

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

[96] The Monitoring and Reporting Regulation requires all operators to meet certain minimum tiers. Larger emission sources are required to meet higher tiers (involving more reliable data quality), while less strict requirements apply to smaller sources for cost-efficiency reasons.

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

A detailed overview of accreditation and verification aspects in 2022 is included in Table 8 in the Staff working document[98].

In 2022, there were 110 accredited verifiers for installations and 23 for aircraft operators. In addition, 28 countries reported that at least one foreign verifier was active in their territory in 2022, and 6 countries reported having only foreign verifiers. This shows that the mutual recognition of verifiers among countries continues to work successfully.

Verifiers' compliance with the Accreditation and Reporting Regulation is found to be high. For 2022, only Norway and France reported verifier suspensions (two in Norway and one in France) and only Romania reported withdrawing a verifier's accreditation (in one case). By comparison, in 2021, there were two suspensions and one withdrawal.

In a parallel to the revision of the Monitoring and Reporting Regulation, the Accreditation and Verification Regulation is under revision with adoption planned in Q1 2024 - ahead of the submission deadline for verified baseline data reports on 30 May 2024.

### 12.3. Competent authorities

The organisation of national competent authorities for implementing the EU ETS differs between countries. In some countries, it involves several local authorities; in others, implementation is more centralised. Countries choose these approaches based on cost- and time-effectiveness. An overview of the EU ETS coordination is presented in Tables 9 and 10 in the Staff working document[99].

All ETS countries reported having at least one central competent authority involved in implementing the EU ETS in 2022. In 15 countries, only central competent authorities are involved. Countries reported using different tools to coordinate work between authorities, such as a central competent authority responsible for the monitoring, reporting, accreditation and verification work (12 countries) or playing a coordinating role[100] (nine countries), binding instructions and guidance by a central competent authority to local authorities (five countries), joint training for competent authorities (seven countries) and regular working groups or meetings between authorities (12 countries). In 2022, 14 countries did not use any of these tools; these countries have a more centralised organisation so need fewer coordination tools.

In 2022, 16 countries did not charge administrative fees to installation operators for the permitting and approval of monitoring plans (up from 15 countries in 2021). Aircraft operators in 17 countries also did not pay any fees (18 countries in 2021). Charges varied significantly by country and type of service – from about EUR 18 to EUR 8 442 for a permit and approval of a monitoring plan for installations, and from about EUR 2 to EUR 4 100 for aircraft operators. 15 countries reported charging administrative fees of different amounts for the approval of monitoring methodology plans or significant changes.

[98] SWD(2023) 346

[99] SWD(2023) 346

[100] 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.

### 12.4. Compliance in the EU ETS

Compliance with the EU ETS is checked in annual cycles. For every year of operation, operators must submit an annual emission report by 31 March the following year. Once the report is checked, operators must surrender the agreed number of allowances by 30 April the same year. For each tonne of $CO_2$ emitted for which no allowance was surrendered on time, the EU ETS Directive imposes a penalty of EUR 100[101]. This is on top of the cost of surrendering allowances due. Other penalties may also apply to infringements in implementing the EU ETS based on national rules. A detailed overview of compliance in the EU ETS is presented in Tables 11 to 13 in the Staff working document[102]. The revision of the ETS Directive includes adjustments to the compliance calendar. From 2024 onwards, the deadline to surrender allowances will be moved from 30 April to 30 September.

In the 2022 compliance cycle, the level of compliance with the EU ETS remained very high. In most years, operators responsible for over 99% of emissions from installations and aviation met their legal obligations on time. The efficiency of the compliance system has improved with a broader uptake of electronic reporting. In 2022, 12 countries used automated IT systems and electronic templates for monitoring plans, emission reports, verification reports and/or improvement reports. Eight countries also use automated IT systems to manage the workflow for monitoring methodology plans, annual activity level reports and other information exchanges on allocation data.

Following the COVID-19 pandemic and restrictions on physical contact, six countries (18 in 2021) allowed verifiers to carry out virtual site visits[103]. For 31 installations and 25 aircraft operators, virtual site visits were approved by the applicable competent authority.

Competent authorities carry out different compliance checks on installations' annual emissions reports. In 2022, all competent authorities checked the completeness of the reports from installations, and most did so for reports from aircraft operators. The exceptions are the competent authorities in Hungary and Latvia (with one and two aircraft operators, respectively), as well as Liechtenstein and Northern Ireland because they do not administer any aircraft operators.

Competent authorities in 12 countries made conservative estimates for 61 installations (approximately 0.7% of all installations), down from 55 in 2020. Such estimates are made if annual emissions reports were not submitted in time, a negative verification opinion was issued, or an emissions report did not comply with the Regulation[104]. All the emissions of 30 installations were estimated conservatively. For 11 installations, a conservative estimation

[101] The penalty is indexed for inflation.

[102] SWD(2023) 346

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

[104] Under Article 70 of the Monitoring and Reporting Regulation.

covered only part of emissions, and 20 installations were estimated to have generated no emissions.

In total, 1.0 Mt emissions were estimated conservatively (up from 0.8 Mt in 2021) out of 2.4 Mt reported by the 61 installations (down from 4.9 Mt in 2021). Typically, conservative estimates were made because emissions reports had not been fully in line with the Monitoring and Reporting Regulation requirements or because they had been submitted after the deadline. Conservative estimates for aviation were reported by five countries (one fewer than in 2021) concerning 33 aircraft operators (five more than in 2021) and 0.14 Mt emissions (also 0.14 Mt in 2021). One airline administered by Denmark accounted for 85% of the conservative estimates for aviation because they had submitted their emission report after the deadline.

Competent authorities' checks remain important to supplement verifiers' work. In addition to checking emissions reports, 18 countries reported that they had carried out on-site inspections at installations. Three countries[105] reported on-site inspections for aviation (no countries reported these inspections in 2021). These numbers decreased during the COVID-19 pandemic, but are expected to increase again.

In 2022, 40 installation operators in 10 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 nine aircraft operators. 13 countries[106] reported 66 infringements, which resulted in penalties, formal warnings or formal notices, aside from excess emissions cases. A total of 21 fines were reported (either issued or to be issued e.g., due to ongoing legal proceedings), amounting to EUR 65.6 million. This includes aviation, with eight infringements in five countries, leading to three fines, for a total of EUR 325 000.

The most common infringements reported for 2022 were a failure to submit an emissions report (16 cases) or an activity level report (four cases) in due time, a failure to notify changes or update the monitoring plan (nine cases) and operation without an emissions permit (six cases).

## 13. Link between the EU ETS and the Swiss ETS

Since 2020, the EU ETS and the Swiss ETS have been linked through an international agreement between the EU and the Swiss Confederation. This means that allowances issued in one system can be surrendered for emissions generated in either of the two systems. With access to a larger market, operators can make cost-efficiency gains and have more options for emissions abatement. The Linking Agreement[107] sets out the conditions and requirements under which the two systems are linked. It also establishes a mechanism to ensure that the linking conditions of Article 25 of the ETS Directive are respected.

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

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

[106] The 13 countries are Czechia, Denmark, Spain, Finland, France, Hungary, Ireland, Netherlands, Norway, Poland, Sweden and Romania.

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

cap and allocation as the EU ETS. In line with Article 7 of the Linking Agreement, this will continue under the revised ETS Directive. Swiss domestic flights and flights departing to EEA airports are covered by the Swiss ETS, while flights departing to Switzerland fall under the EU ETS. This arrangement safeguards the environmental integrity of both systems. Both the EU ETS and the Swiss ETS have applied the same approach to flights with the UK since Brexit, covering only departing flights to the UK.

Tables 16 and 17 in the Staff working document[108] show key figures for both systems in 2022 – 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.

To implement the Linking Agreement and promote efficiency gains, a direct technical link was created between both systems' registries. This allows regulated entities to transfer allowances from an account in one system to an account in the other. The transfers are scheduled, generally taking place twice a month. From 2023, the registry link between the two emissions trading systems will gradually develop into a permanent feature. This will improve market liquidity and the execution of transactions between the two linked systems as though they were one market. Market participants will be able to act as if they were in one market, subject only to the individual regulatory rules of the EU and Switzerland. A permanent link should be implemented in 2024 at the latest.

Table 18 in the Staff working document[109] presents the effects of the EU ETS and Swiss ETS link in 2022. It shows to what extent regulated entities in both systems used allowances issued in the other system for compliance.

In total, regulated entities in the EU ETS (both installations and aircraft operators) used 971 170 allowances issued under the Swiss ETS for compliance in 2022. This is nearly 83 200 allowances more than 2021 and almost 378 000 allowances more than in 2020, signifying an increasing trend in the use of the flexibility that the link between the EU ETS and the Swiss ETS provides. This was achieved despite the fact that EU aircraft operators used fewer aviation allowances issued under the Swiss ETS in relative terms (0.7% in 2022 compared to 1.5% in 2021). However, this was partly compensated by an increased use of Swiss general allowances (0.1% in 2022 compared to close to zero in 2021).

The number of Swiss general allowances used for compliance by installations in the EU remained stable at 394 722. More impressively, the number of Swiss ETS aviation allowances used for compliance by EU ETS installations almost tripled in the same period, increasing from 63 410 in 2021 to 173 650 in 2022. The increased use of aviation allowances for compliance signals rising awareness and acceptance of the EU ETS and Swiss ETS link. In relative terms, general allowances issued under the Swiss ETS accounted for less than 0.03% of the total surrendered in the EU ETS in 2022. However, this accounted for a bigger share of almost 9.7% of all Swiss ETS general allowances allocated for free and auctioned that year.

[108] SWD(2023) 346
[109] SWD(2023) 346

In the Swiss ETS, installations used a lower share of EU ETS general allowances for compliance in 2022 (6.2%) compared to 2021 (8.2%). In both years, installations in the Swiss ETS did not use EU ETS aviation allowances for compliance.

Table 18 in the Staff working document[110] aggregates the volume of allowances (both general and aviation) transferred on behalf of market participants between the EU ETS and the Swiss ETS since 2020. So far, 2022 had the highest number of aggregate total transfers. The current historical balance shows an outflow of 502 106 allowances from the EU ETS to the Swiss ETS. It should, however, be noted that the figures may include re-transfers of the same allowances.

## 14. 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 Directive 2023/1791 (Energy Efficiency Directive)[111]. It has also been revised as part of Fit for 55. 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 interacts with policy measures and actions implemented to that end.

The revised Energy Efficiency Directive introduces new rules to reduce final energy consumption at EU level by 11.7% in 2030. All Member States will contribute to achieving this target. They will set indicative national contributions and paths to reach the target in their integrated national energy and climate plans (NECPs) under Regulation 2018/1999[112] (Governance Regulation).

The carbon price signal of the EU ETS feeds into the appraisal of energy efficiency-related investments and measures in the sectors covered. Member States also use auction revenue from the EU ETS to fund energy efficiency improvements. In 2022, they reported spending EUR 4.8 billion to fund projects related to energy efficiency. This included not only investments in the thermal modernisation of buildings, energy efficiency advice as well as research and development, all with the objective to reduce energy consumption, but also social support measures in light of the energy crisis.

NECPs set out how Member States intend to address not only energy efficiency, but also renewables' deployment, emission reductions, industrial diversification, interconnections and research and innovation in the context of EU climate and energy targets. They may include measures to promote decarbonisation of EU ETS sectors, ways of using ETS revenue for the green and just transformation and plans to cancel ETS allowances in view of a scheduled phase out of fossil fuels for electricity generation.

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[110] SWD(2023) 346

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

[112] Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council (OJ L 328, 21.12.2018).

Under Article 14 of the Governance Regulation, Member States were expected to have submitted their draft updated NECPs to the Commission by the end of June 2023. These updated plans should take into account the more ambitious EU climate targets under the Climate Law and amendments to key pieces of the EU energy and climate legislation under Fit for 55. By December 2023, the Commission will consolidate an EU-wide assessment of the updated NECPs and issue country-specific recommendations. In the final updated plans, due by the end of June 2024, Member States will be expected to have addressed the Commission's recommendations.

## 15. Conclusions and outlook

In the ETS sectors, 2022 was marked by the effects of the energy crisis in Europe. Emissions from electricity and heat generation grew due to an increased use of coal prompted by higher prices of natural gas. An overall reduction in emissions from ETS installations was driven mainly by the manufacturing industry, affected by higher fuel and energy prices.

Despite the disruption caused by the energy crisis in the ETS sectors, the EU ETS has continued to function smoothly. Emissions from installations remained on a downward trend compared to the pre-pandemic-2019 level. Auctions of allowances continued as planned. Except for a short-term dip coinciding with the start of Russia's full-scale invasion of Ukraine, the carbon price signal remained robust.

The Market Stability Reserve continued to remove the surplus of allowances from the EU ETS, fostering a balanced and resilient carbon market. The Reserve also invalidated over 2.5 billion allowances of the historical surplus. This is more than all the international credits used for compliance in the EU ETS to date.

A strong carbon price signal in 2022 led to higher EU ETS auction revenue – nearly EUR 39 billion. This revenue was mainly distributed to Member States that have largely used it to support climate and energy action, including measures to address the effects of the energy crisis and help people and businesses. On top of this, disbursements from the Modernisation Fund have helped advance the modernisation of the energy sector in all beneficiary Member States, and the Innovation Fund has directed significant resources to energy and industry transformation.

The EU ETS remains a crucial vehicle for the green transition. In addition to pricing carbon, in the short-term, it will help fund measures under the REPowerEU plan to boost energy savings, diversify energy supplies and accelerate the deployment of renewable energy. With the revision of the ETS Directive, the system is strengthened to create incentives for far-reaching, long-term decarbonisation and discourage carbon lock-in. With the EU ETS scope extended to the maritime sector from 2024 and ETS 2 for buildings, road transport and small-emitting industry launching in 2027, carbon pricing will cover three quarters of the EU economy. In addition, the system leverages more resources to support people and businesses in the green transition.