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REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

on the Functioning of the European Carbon Market in 2020 pursuant to Articles 10(5) and 21(2) of Directive 2003/87/EC (as amended by Directive 2009/29/EC and Directive (EU) 2018/410)

{COM(2021) 950 final} - {SWD(2021) 308 final}

Table of Contents

List of acronyms and abbreviations

AVR	Accreditation and Verification Regulation
CEF DI	Connecting Europe Facility Debt Instrument
CEMs	Continuous Emissions Measurement Systems
CINEA	European Climate, Infrastructure and Environment Executive Agency
CO_2	Carbon Dioxide
CO_2eq	Carbon Dioxide Equivalent
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
CP2	Second Commitment Period of the Kyoto Protocol
EA	European Cooperation for Accreditation
EEA	European Economic Area
EED	Energy Efficiency Directive
EEX	European Energy Exchange
EIB	European Investment Bank
ESMA	European Securities and Markets Authority
EU27	European Union Member States
EU ETS	European Union Emissions Trading System
EUTL	European Union Transaction Log
GHG	Greenhouse Gas
ICAO	International Civil Aviation Organization
ICE	InterContinental Exchange Futures Europe
InnovFin EDP	InnovFin Energy Demonstration Projects
MAR	Market Abuse Regulation
MiFID2	Directive on Markets in Financial Instruments
MiFIR	Regulation on Markets in Financial Instruments
MRR	Monitoring and Reporting Regulation
MSR	Market Stability Reserve
N_2O	Nitrous Oxide
NECPs	National Energy and Climate Plans
NER	New Entrants Reserve
OTC	Over-the-counter
PFCs	Perfluorocarbons
SARPs	CORSIA Standards and Recommended Practices
TNAC	Total Number of Allowances in Circulation
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change

1. INTRODUCTION

The European Union Emissions Trading System (EU ETS) has been a cornerstone of the EU's strategy for reducing greenhouse gas (GHG) emissions since 2005. Since it was launched in 2005, emissions in the power and heat generation as well as energy-intensive industrial sectors, covered by the EU ETS, have fallen by around 43%[1]. Together with other legislation, such as on renewable energy[2] and energy efficiency[3], it has contributed significantly to achieving the EU's overall target of reducing GHG emissions by 20% by 2020 from 1990 levels. The EU surpassed this target and reduced GHG emissions by approximately 31%[4] below 1990 levels in 2020.

In July 2021, the Commission adopted a package of proposals to deliver the European Green Deal[5]. The proposals aim to make the EU's climate, energy, land use, transport and taxation policies fit for the task of reducing net GHG emissions by at least 55% by 2030 compared to 1990 levels. The EU ETS will play a major role in achieving this objective. The package contains a proposal to increase the ambition of the EU ETS with a new emissions reduction target of 61%[6] below 2005 levels by 2030 (compared to 43% below 2005 levels currently), a lower overall emissions cap, and a steeper annual emissions reduction of 4.2% instead of the current 2.2% per year.[7] The proposal for the revision of the EU ETS also extends its coverage to maritime emissions and proposes a new, separate emissions trading system to cover emissions from fuels used in road transport and buildings[8].

A separate proposal strengthens the Market Stability Reserve (MSR)[9], the mechanism that addresses the surplus of allowances built up in the EU ETS since 2019 and improves the system's resilience to major shocks by adjusting the supply of allowances to be auctioned.

Two additional proposals from the July package strengthen the EU ETS for aviation[10] to ensure the sector contributes to the EU's emissions reduction target, and to implement the

[1] Until the end of 2020, for EU27 + the UK + Iceland, Liechtenstein and Norway (which was the scope of the EU ETS until 31 December 2020).
[2] 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, OJ L 328, 21.12.2018, p. 82
[3] Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency, OJ L 328, 21.12.2018, p. 210
[4] Emissions reductions for EU27. For EU27 + the UK, the decrease was 32.5% below 1990 levels.
[5] Delivering the European Green Deal of 14.7.2021
[6] This target includes the proposed extention of the scope of the EU ETS to the maritime transport sector.
[7] Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and Regulation (EU) 2015/757, COM/2021/551 final
[8] COM(2021)551 final (as above)
[9] Proposal for a Decision of the European Parliament and of the Council amending Decision (EU) 2015/1814 as regards the amount of allowances to be placed in the market stability reserve for the Union greenhouse gas emission trading scheme until 2030, COM/2021/571 final
[10] Proposal for a Directive of the European Parliament and of 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, COM/2021/552 final, and Proposal for a Decision of the European Parliament and the Council 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, COM/2021/567 final

Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) in EU law in a way that is consistent with the EU's 2030 climate objectives.

This report on the functioning of the European carbon market is presented in line with Articles 10(5) and 21(2) of the Directive 2003/87/EC (EU ETS Directive)[11]. It covers the year 2020 and the first half of 2021 (until 30 June 2021); as 2020 marks the last year of phase 3 of the EU ETS (2013-20), it also provides an overview of the main developments over this period.

The report examines the significant emissions reductions achieved during phase 3 and the drivers behind them (Chapter 3.2.1), and analyses the role of the MSR in reducing the surplus of allowances built up in the EU ETS (Chapter 3.2.2). It also highlights major phase 3 developments in the fields of aviation (Chapter 4), free allocation (Chapter 3.1.2), the auctioning of allowances, the resulting auction revenues and their utilisation (Chapter 3.1.3), the EU ETS funding instruments (Chapters 3.1.4 to 3.1.8), market oversight (Chapter 5), and the effectiveness of implementing the EU ETS in participating countries (Chapter 6). It includes two new chapters: Chapter 7 describes the linking between the EU ETS and the Swiss ETS and examines the effect the link had on the two carbon markets, while Chapter 8 examines the impact of implementing the Directive 2012/27/EU as amended by the Directive (EU) 2018/2002[12] (Energy Efficiency Directive) and the 2019 national energy and climate plans (NECPs) on the EU ETS.

Unless otherwise indicated, the data used for this report were data that were either publicly available or available to the Commission by the end of June 2021. The report covers 2020 data for the United Kingdom (UK), to reflect the scope of the EU ETS until 31 December 2020. Technical and descriptive information on the EU ETS is provided in the appendices to the staff working document accompanying this report.

2. EU ETS INFRASTRUCTURE AND COVERAGE

Throughout phase 3 of the EU ETS (2013-20), the system covered 28 EU Member States (including the UK) and three EFTA countries - Iceland, Liechtenstein and Norway. As of 1 January 2021, the EU ETS covers 27 Member States plus Iceland, Liechtenstein and Norway, and also electricity generating installations in Northern Ireland. As of 1 January 2020, the EU ETS is linked with the Swiss carbon market (See Chapter 7).

In total, the EU ETS regulates emissions from more than 10 400 power and heat plants and manufacturing installations, as well as around 350 aircraft operators flying between European Economic Area (EEA) airports, and from the EEA to Switzerland and the UK. Although in the beginning of phase 3, the EU ETS covered approximately half of all GHG emissions in

[11] 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, p. 32

[12] Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency, OJ L 328, 21.12.2018, p. 210

the EU, it currently covers around 36% of the EU's GHG emissions. A detailed overview of the EU ETS coverage in phase 3 is available in Appendix 1 to the staff working document accompanying this report.

2.1 EU Registry and the European Union Transaction Log

The EU Registry and the European Union Transaction Log (EUTL) track the ownership of general and aviation allowances by recording the amounts owned in the accounts and the transactions between accounts. These systems also register the emissions of stationary (power and heat, and industry) installations and aircraft operators, and compliance with obligations stemming from these emissions. Both systems are operated and maintained by the Commission, whereas the national registry administrators in the participating countries remain the point of contact for account holders and representatives (companies and individuals). While the EU Registry holds the accounts and registers information on compliance, and the EUTL automatically checks, records and authorises all transactions between accounts, thus ensuring that all transfers comply with the EU ETS rules.

The data recorded in the EU Registry and the EUTL continues to be an important source of information underpinning multiple types of the EU ETS reporting, such as the calculation of the Market Stability Reserve (MSR) surplus indicator (See Chapter 3.2.2) and the reporting carried out by the European Environment Agency. The EUTL also provides transparency in the EU ETS by publishing information on the compliance of stationary installations and aircraft operators with EU ETS provisions and on the transactions between accounts.

During phase 3, the public website of the EUTL functioned reliably, remaining operational for 365 days around the clock each year, with only minor interruptions due to planned technical upgrades. This was also the case in 2020. An exception was 18 August 2020, when, due to technical issues, several transactions were not processed correctly. Due to troubleshooting and repair work between 19 and 21 August, the EU Registry was unavailable.

Several major development works were carried out on the EU Registry in 2020 and the first half of 2021. First, the Trade and Cooperation Agreement[13] between the EU and the UK was applied provisionally as of 1 January 2021 and entered into force on 1 May 2021. In the Agreement, the EU and the UK commit to upholding the level of ambition of their climate and environmental policies as at the end of 2020, and to adapting these policies in line with their international obligations. Article 392 of the Agreement provides that as of 1 January 2021, both parties shall have a system of carbon pricing in place, covering GHG emissions from electricity and heat generation, industry and aviation. Northern Ireland electricity generators and departing flights from the EEA to the UK remain covered by the EU ETS, while flights from the UK to the EEA fall under the UK's carbon pricing system (See Chapter

[13] Trade and Cooperation Agreement between the European Union and the European Atomic Energy Community, of the one part, and the United Kingdom of Great Britain and Northern Ireland, of the other part, OJ L 149, 30.4.2021, p. 10

4). Consequently, Northern Ireland electricity generators remained in the EU Registry, and the EU ETS Directive was amended to accommodate changes in the flights' coverage.[14]

The Doha Amendment establishing the second commitment period (CP2) of the Kyoto Protocol (1 January 2013 - 31 December 2020) also entered into force[15] on 31 December 2020. According to Article 5 of the Commission Regulation (EU) 389/2013 (Registry Regulation)[16], the Commission acts as the administrator of the EU's Kyoto Protocol Registry, which is part of the EU Registry. Although 31 December 2020 was the last day of CP2, the Kyoto Protocol transparency and compliance system will continue to operate until the final compliance check. In 2023, the emissions inventories for the last year of CP2 will be reported, reviewed and a final report submitted.

The agreement on linking the EU ETS with the Swiss ETS[17] entered into force on 1 January 2020. To operationalise the link between the systems, a provisional solution to link registries of the two systems and enable allowances to be transferred between them was put in place on 21 September 2020 (See Chapter 7).

Finally, technical implementation of the new rules brought by the Commission Delegated Regulation (EU) 2019/1122[18] was successfully completed and the new functionalities became available in the EU Registry as of 1 January 2021.

3. FUNCTIONING OF THE CARBON MARKET

3.1. Supply: allowances put in circulation

3.1.1. Cap

The cap is the maximum absolute quantity of GHG emissions that may be emitted by entities covered by the EU ETS to ensure the ETS emissions reduction target is met, corresponding to the number of allowances put into circulation over a trading period. A common EU-wide cap applies for the entire EU ETS (for detailed information on the cap, see Appendix 2 to the staff working document accompanying this report). During phase 3 of the EU ETS (2013-20), the cap decreased every year by the linear reduction factor of 1.74%, ensuring that total emissions fell (See Chapter 3.2.1). In phase 4 of the EU ETS (2021–30), the cap for both stationary installations and aviation decreases annually by the linear reduction factor of 2.2%.

[14] Commission Delegated Regulation (EU) 2021/1416 of 17 June 2021 amending Directive 2003/87/EC of the European Parliament and of the Council as regards the exclusion of incoming flights from the United Kingdom from the Union emissions trading system, OJ L 305, 31.8.2021, p. 1

[15] Communication from the Commission concerning the entry into force of the Doha Amendment to the Kyoto Protocol to the United Nations Framework Convention on Climate Change, OJ C 432, 14.12.2020, p.1

[16] Commission Regulation (EU) No 389/2013 of 2 May 2013 establishing a Union Registry pursuant Directive 2003/87/EC on the European Parliament and of the Council, Decisions No 280/3004/EC and No 406/2009/EC of the European Parliament of the Council and repealing Commission Regulations (EU) No 920/2010 and No 1193/2011, OJ L 122, 3.5.2013, p. 190

[17] 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, p. 3

[18] Commission Delegated Regulation (EU) 2019/1122 of 12 March 2019 supplementing Directive 2003/87/EC of the European Parliament and of the Council as regards the functioning of the Union Registry, OJ L 177, 2.7.2019, p. 3

Table 1 shows the figures for the cap on emissions from stationary installations and the number of aviation allowances put into circulation[19] each year during phase 3.

Table 1. EU ETS cap in phase 3 of the EU ETS (2013-20)

Year	Annual cap (stationary installations)	Annual aviation allowances put into circulation[20]
2013	2 084 301 856	32 455 296
2014	2 046 037 610	41 866 834
2015	2 007 773 364	50 669 024
2016	1 969 509 118	38 879 316
2017	1 931 244 873	38 711 651
2018	1 892 980 627	38 909 585
2019	1 854 716 381	38 830 950
2020	1 816 452 135	42 803 537

On 1 February 2020, the Agreement on the withdrawal of the United Kingdom from the European Union[21] entered into force. The EU ETS Directive applied to the UK until 31 December 2020, and pursuant to the Protocol of Ireland and Northern Ireland[22], electricity generation located in Northern Ireland remains in the EU ETS with the relevant rights and obligations.

The Commission reacted to these changes by adopting the Decision on the adjusted EU-wide quantity of allowances on 16 November 2020.[23] Only emissions from electricity generation in Northern Ireland were accounted for in the updated cap (applied from the base period 2008-

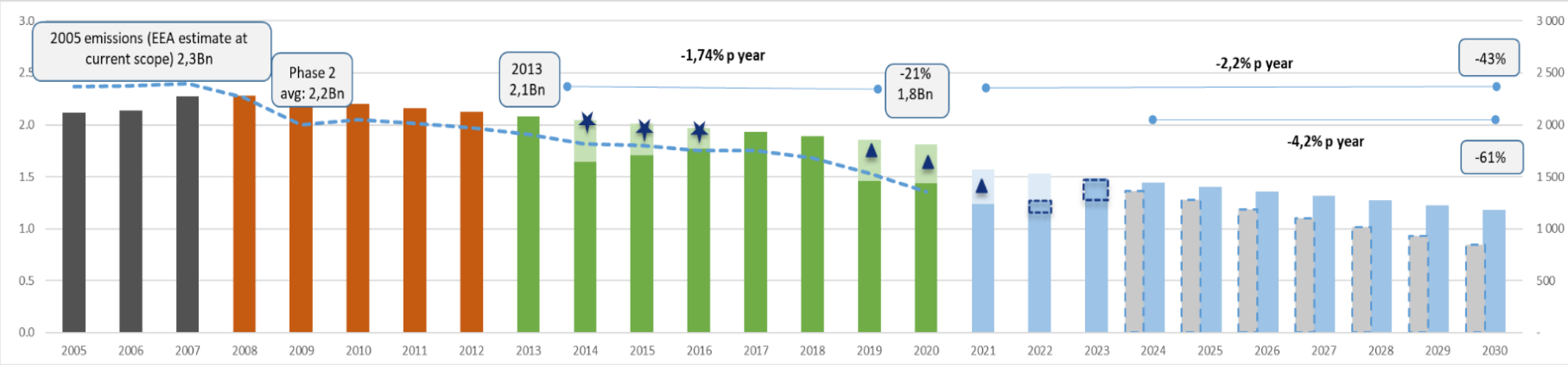
[19] The number of aviation allowances put into circulation since 2013 is the result of a bottom-up approach starting from free allocation (determined on the basis of activity-based benchmarks for operators' activity within the EEA). The number of allowances auctioned is then derived based on the fact that free allocation (including a special reserve for distribution to fast-growing aircraft operators and new entrants) should be 85% of the total volume. Auctioning represents the remaining 15%.
[20] The updated figures include exchanges of international credits to EU ETS allowances in addition to the free allocation and auctioned amounts.
[21] Agreement on the withdrawal of the United Kingdom of Great Britain and Northern Ireland from the European Union and the European Atomic Energy Community, OJ L 29, 31.1.2020, p. 7
[22] OJ L 29 (as above)
[23] Commission Decision C/2020/1722 of 16 November 2020 on the Union-wide quantity of allowances to be issued under the EU Emmissions Trading System for 2021, OJ L 386, 16.11.2020, p. 26

2012), which calculated a reduction of the cap in proportion to the emissions from the UK that were no longer accounted for.[24]

Figure 1 summarises the cap reduction following the increase of the linear reduction factor to 2.2% as of 2021. It also illustrates the role of the Market Stability Reserve (MSR) feed and the backloading contributions to the MSR (See Chapter 3.2.2). The dashed bars in the figure approximate the impact of the higher 2030 emissions reduction target as proposed by the Commission in the revision package to deliver on the European Green Deal on 14 July 2021.

[24] The cap for 2021 set out in the Commission Decision C/2020/1722 does not include the quantity of allowances to be issued pursuant to Chapter II of the EU ETS Directive in respect of aircraft operators. This quantity is the result of a bottom-up approach starting from free allocation to aviation, as explained in the Notice on the Union-wide quantity of allowances for 2021 and the Market Stability Reserve under the EU Emissions Trading System, OJ C 428I, 11.12.2020, p. 1

Figure 1. Cap reduction applying the linear reduction factor of 2.2% as of 2021[25]



★ Backloaded allowances (total 900 million)

▲ Market Stability Reserve feed

⬚ Market Stability Reserve feed in/out depending on market surplus

[25] The cap for phase 4 reflects the post-BREXIT publication of the EU ETS total volume of allowances in the Commission Decision (EU) 2020/1722.

3.1.2. Free allocation

Although since phase 3 auctioning accounts in principle for the distribution of 57% of the total volume allowances, a significant volume of allowances is allocated for free to address the risk of carbon leakage (when activites move to non-EU countries with less ambitious climate policies on GHG emissions, which may lead to an overall increase in emissions). Electricity production was not eligible for free allowances, and the free allocation to industry was based on performance benchmarks to strengthen the incentives to reduce GHG emissions and increase innovation.

At the start of phase 3, the New Entrants' Reserve (NER) was created in the EU ETS to provide additional free allocations to new industrial installations and installations with a significantly increasing capacity, equivalent to 5% of the total volume of allowances for this period. The sectors and sub-sectors deemed to be exposed to a significant risk of carbon leakage, and thereby awarded a higher share of free allocation, were placed on a carbon leakage list.[26] As demand for free allocation exceeded the supply available, the allocation was reduced for all installations by the same percentage by applying the cross-sectoral correction factor[27], which was revised[28] in 2017. The values of the cross-sectoral correction factor are presented in Table 3.1 of Appendix 3 to the accompanying staff working document.

The initial Reserve held 480.2 million allowances, after deducting 300 million allowances for the NER 300 programme supporting innovation (See Chapter 3.1.5). As at June 2021, 178.3 million allowances were reserved for 1 392 installations for the entirety of phase 3. Therefore, 301.9 million allowances remain in the Reserve. Of this amount, 200 million allowances will be placed in the Reserve for phase 4 and the rest will be placed in the MSR.

As at June 2021, the originally approved volume of free allocation for phase 3 has been reduced by around 585 million out of 6.5 billion allowances, due to installations closing down or reducing their production or production capacity. Table 2 summarises free allocations to industry in phase 3.

[26] Commission Decision of 27 October 2014 determining, pursuant to Directive 2003/87/EC of the European Parliament and of the Council, a list of sectors and subsectors which are deemed to be exposed to a significant risk of carbon leakage, for the period 2015 to 2019, OJ L 308, 29.10.2014, p. 114

[27] Commission Decision 2013/448/EU of 5 September 2013 concerning national implementation measures for the transitional free allocation of greenhouse gas emission allowances in accordance with Article 11(3) of Directive 2003/87/EC of the European Parliament and of the Council, OJ L 240, 7.9.2013, p. 27

[28] Commission Decision 2017/126/EU of 24 January 2017 amending Decision 2013/448/EU as regards the establishment of a uniform cross-sectoral correction factor in accordance with Article 10a of Directive 2003/87/EC of the European Parliament and of the Council, OJ L 19, 25.1.2017, p. 93

Table 2. Free allowances allocated to industry, January 2013 - June 2021 (in millions) [29]

	2013	2014	2015	2016	2017	2018	2019	2020
Free allocation[30] (EU27 + the UK + Iceland, Liechtenstein and Norway)	903.0	874.8	847.6	821.3	796.2	771.9	748.1[31]	724.8
Allocation from the New Entrants' Reserve (greenfield investments and capacity increases)	11.7	15.2	18.9	22.8	24.6	26.9	29.1	28.9
Free allowances remaining unallocated due to closures or changes in production or production capacity	41.9	61.3	74.0	76.5	79.9	85.1	80.3	85.9

Although submissions from participating countries concerning free allocation changes for the last year of phase 3 could still be sent in 2021, the vast majority of the changes have already been reported. Therefore, it can be concluded that at the end of phase 3, there were approximately:

- 1 821 installations out of 11 646 that ceased operation or had a physical change that reduced their capacity under the threshold and thus their GHG permit was withdrawn
- 505 new entrants
- 887 significant capacity extensions
- 378 significant capacity reductions
- 2 985 installations that underwent partial cessations and
- 1 434 installations that recovered after a partial cessation.

Unallocated allowances from closures, partial cessations or significant capacity reductions (under Articles 10a(19) and 10a(20) of the EU ETS Directive) will be placed in the MSR in accordance with Article 1(3) of the Decision (EU) 2015/1814 (MSR Decision)[32], like the unallocated allowances from the NER.

[29] Althought in previous Carbon market reports, data were based on notifications by participating countries submitted annually by the end of June, in this and last year's Carbon market reports data are based on the EU Registry with cut-off dates of 30 June 2021 and 2020 respectively. This new approach was chosen to reflect allocations more accurately as they occur and are recorded in the Registry.

[30] Initial allocation volume, before the application of the cross-sectoral correction factor.

[31] Allocation for the UK (48.0 million allowances of the total for 2019), suspended in 2019 due to the safeguard measures 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, resumed in 2020.

[32] Decision (EU) 2015/1814 of the European Parliament and of the Council of 6 October 2015 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and amending Directive 2003/87/EC, OJ L 264, 6.10.2015, p. 1

To prevent the risk of carbon leakage, free allocation continues in phase 4, based on updated benchmark values derived from the performance of the 10% most efficient installations in the EU. After the political agreement reached on the revised EU ETS Directive in November 2017, the Commission adopted legislation for the implementation of free allocation to industry in phase 4. The adopted legal acts are listed in Table 4.1 of Appendix 4 to the accompanying staff working document.

3.1.3. Auctioning of allowances

As of phase 3, auctioning is the primary method of distributing allowances in the EU ETS, accounting for 57% of the total volume. The auctioning is governed by the Commission Regulation (EU) 1031/2010[33] (Auctioning Regulation), which specifies the timing, administration and other aspects of how auctions should take place to ensure an open, transparent, harmonised and non-discriminatory process.

In phase 3, auctions took place through the following auction platforms:

- European Energy Exchange AG (EEX), auctioning as the common auction platform for 25 Member States participating in a joint procurement procedure. It also auctions for Poland (which opted-out from the joint procurement procedure but has not yet appointed its own auction platform), and, since June 2019, for Iceland, Liechtenstein and Norway (after the EEA Agreement was amended to allow Iceland, Liechtenstein and Norway to participate in the Joint Procurement Agreement for the common auction platform)
- EEX, auctioning for Germany as the 'opt-out' auction platform
- ICE Futures Europe (ICE), auctioning for the UK as the 'opt-out' auction platform until the end of 2020.

The EEX was reappointed as the common auction platform as from 2021, without major changes to the participation in auctions.

Over 1 800 auctions were held in phase 3, and by 30 June 2021, this figure was well over 1 900. Table 3 provides an overview of the volumes of allowances[34] auctioned by the EEX and ICE platforms up to 30 June 2021, including early auctions[35] of general allowances.

[33] 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, p.1

[34] The volumes of general allowances have been determined taking into account Decision 1359/2013/EU. The volumes of aviation allowances have been determined taking into account Decision No 377/2013/EU and Regulation (EU) No 421/2014.

[35] Early auctions of allowances in phase 3 were performed in 2012 in view of the widespread commercial practice in the electricity sector of selling electricity on a forward basis and purchasing the required inputs (including allowances) when they sell their output.

Table 3. Total auctioned volumes of phase 3 allowances, January 2012 - 30 June 2021[36]

Year	General allowances	Aviation allowances
2012	89 701 500	2 500 000
2013	808 146 500	0
2014	528 399 500	9 278 000
2015	632 725 500	16 390 500
2016	715 289 500	5 997 500
2017	951 195 500	4 730 500
2018	915 750 000	5 601 500
2019	588 540 000	5 502 500
2020	778 505 000	7 505 000
2021 (until 30 June 2021)	308 326 000	1 343 000

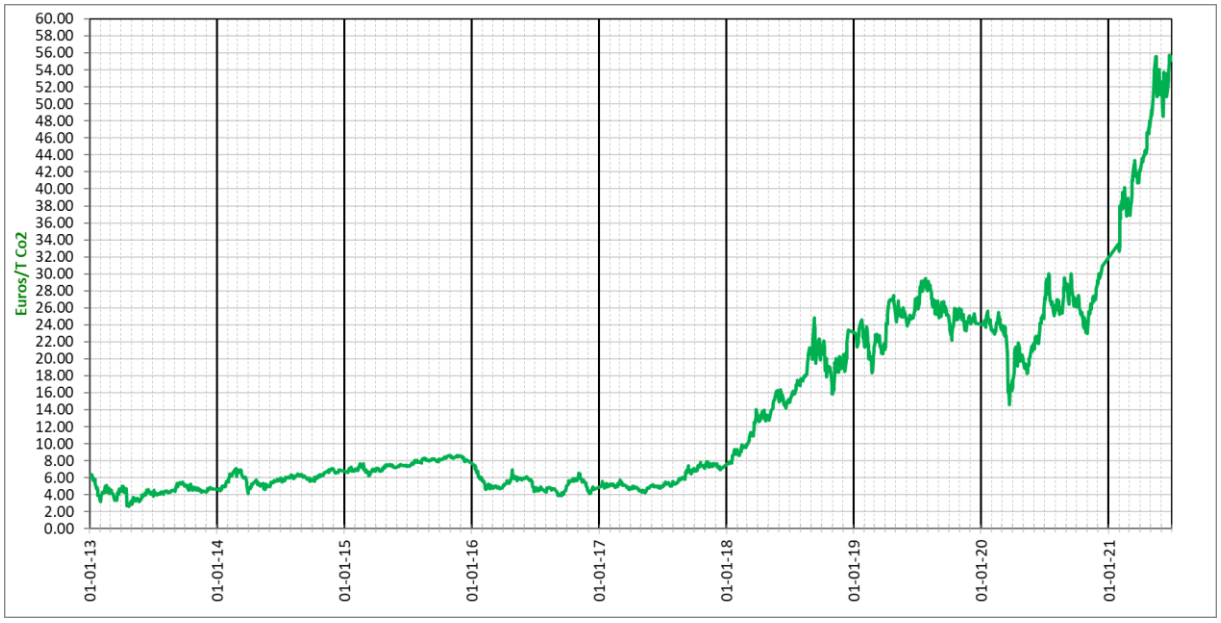
Source: EEX

When the MSR became operational in January 2019, it has substantially lowered the supply of allowances available for auction. Generally, the auctions were conducted smoothly and the auction clearing prices were closely aligned with secondary market prices.

In phase 3, a total of 15 auctions out of over 1 800 were cancelled either because the reserve price was not met or because the total bid volume fell short of the auctioned volume, in line with the rules of the Auctioning Regulation. Figure 2 gives an overview of the auction clearing prices in the EU carbon market since 2013.

[36] The table includes auction volumes for EU27 + the UK + Iceland, Liechtenstein and Norway (except for 2021, which does not include data on the UK).

Figure 2. Clearing prices for auctions of general allowances, January 2013 - 30 June 2021



Source: EEX

The number of participants in the auctions of general allowances in phase 3 is provided in Appendix 5 to the staff working document accompanying this report. The auction platforms publish detailed results of each auction in a timely manner on the specific websites. Further information on the performance of the auctions, including on the participation, cover ratios and prices, can be found in the participating countries' reports published on the Commission's website[37].

The total revenues generated by Member States, the UK and Iceland, Liechtenstein and Norway from the auctions in phase 3 exceeded EUR 68 billion (See Tables 5.1, 5.2, and 5.3 in the accompanying staff working document)[38]. In 2020 alone, auctions generated total revenues of over EUR 19 billion, and EUR 13.9 billion in the first half of 2021. The EU ETS Directive provides that Member States should use at least 50% of their auction revenues, including all revenues generated from allowances distributed for the purposes of solidarity and growth, and all revenues from allowances issued in respect of aviation[39], for climate- and energy-related purposes.

According to the information submitted by Member States to the Commission, it is estimated that in 2020, around 72% of auction revenues was used for climate and energy purposes, and around 75% (EUR 56.5 billion) of total revenues throughout phase 3. Although a small share of this amount (about 3% of total revenues since 2013) was spent internationally, the majority of auction revenues in phase 3 was spent on domestic climate and energy purposes (mostly

[37] Auctioning in the EU ETS
[38] The numbers include allowances auctioned for the Innovation and Modernisation Funds.
[39] Article 3d(4) of the EU ETS Directive

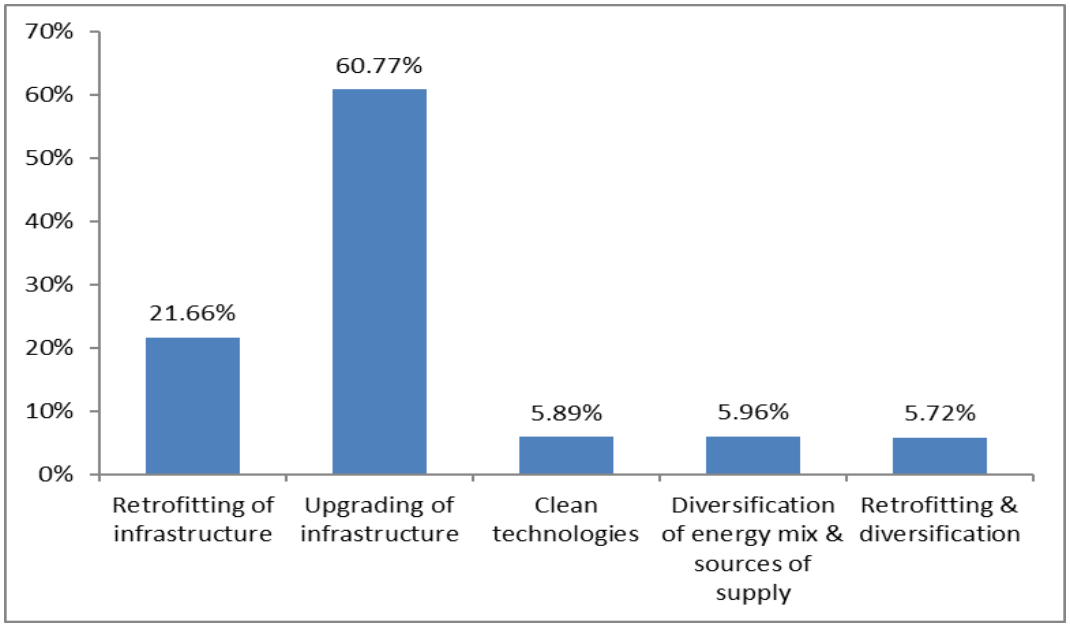
on renewable energy, energy efficiency, and research and development). In practice, Member States spend more on climate- and energy-related purposes than their auctioning revenues.[40]

3.1.4. Derogation from full auctioning for electricity and heat production

In phase 3, Article 10c of the EU ETS Directive derogated from the general rule to auction allowances in order to support investments in modernising the electricity sector in several lower income Member States.[41] The free allowances under Article 10c were deducted from the quantity that the Member State would otherwise auction. As the free allocation of allowances to electricity generators under Article 10c involved State aid, the national schemes set up to implement the Article 10c derogation were cleared under State aid rules and were subject to the requirements of the State aid Guidelines.[42]

The total value of reported investment support under Article 10c from 2009 to 2020 is over EUR 13.1 billion. As shown in Figure 3, 83% of this amount was dedicated to upgrading and retrofitting infrastructure (mostly to modernise coal and gas power plants, and to upgrade electricity and heat networks). The residual investments were to diversify the energy mix and to develop clean technologies.

Figure 3. Total support under Article 10c per type of investment, 2013 - 2019



Source: DG Climate Action

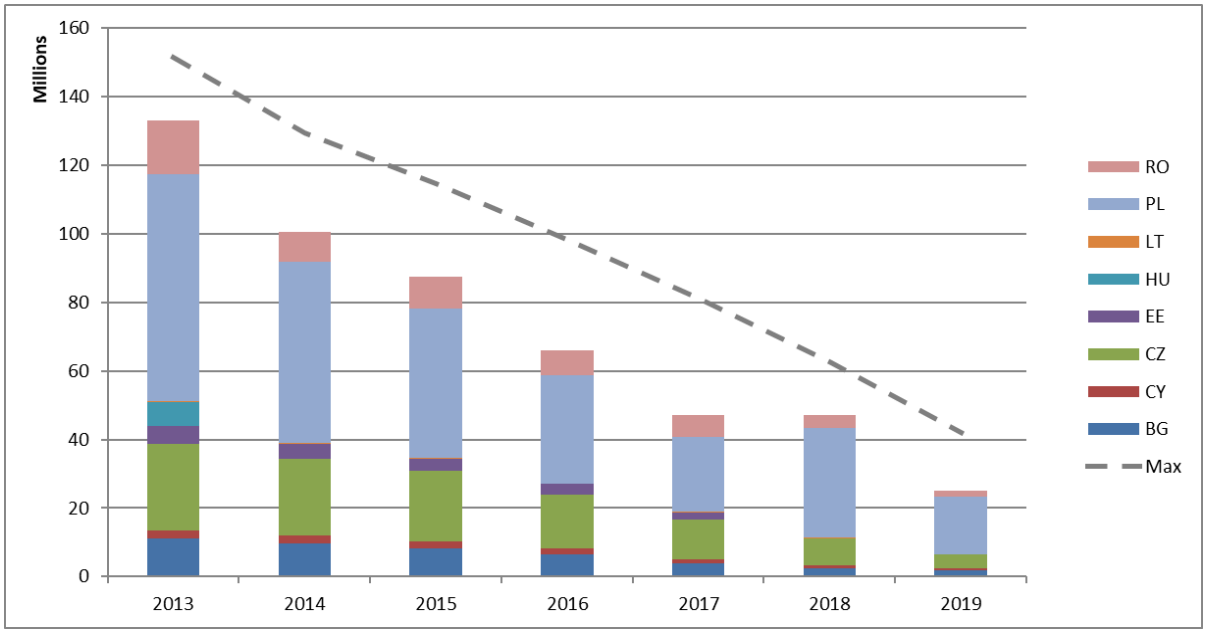
Figure 4 shows the number of Article 10c allowances allocated for the period 2013-19 per EU Member State (no allowances were allocated for 2020).

[40] Detailed information on the use of auctioning revenues can be found in the EU Climate Action Progress Report 2021 COM(2021)960.

[41] Bulgaria, Cyprus, Czechia, Estonia, Hungary, Latvia, Lithuania, Malta, Poland and Romania were eligible to use the Article 10c derogation. Malta and Latvia decided not to do so in phase 3.

[42] Guidelines on certain State aid measures in the context of the greenhouse gas emission allowances trading scheme post 2012, OJ C158, 5.6.2012, p. 4

Figure 4. Allowances allocated for free pursuant to Article 10c, 2013 - 2019[43]



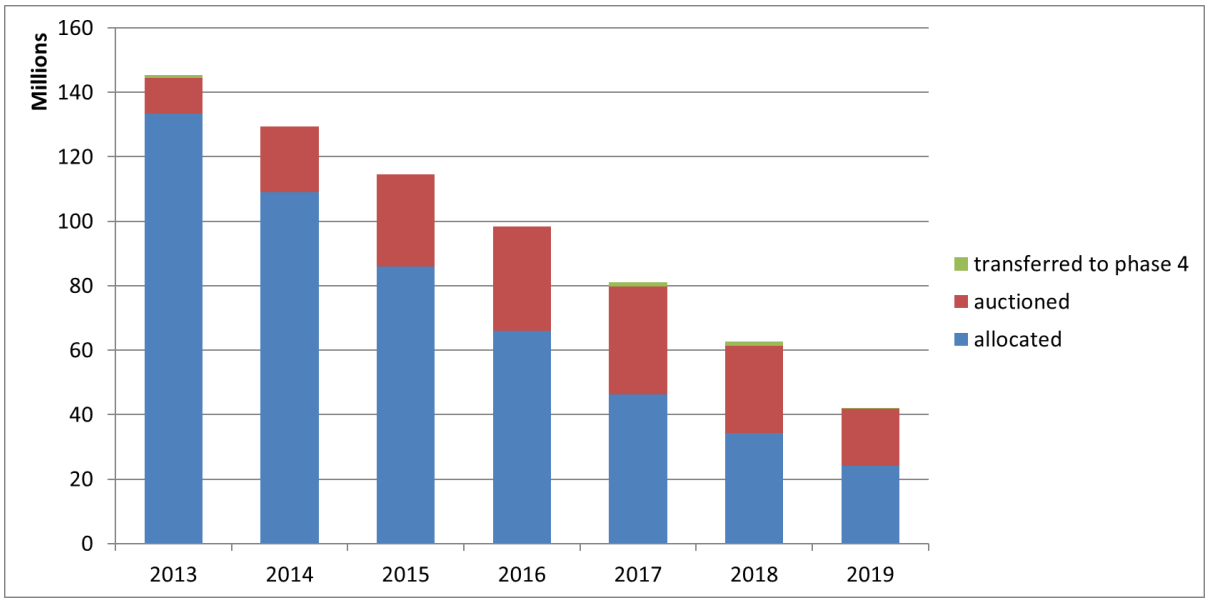
Source: DG Climate Action

Table 6.1 of Appendix 6 to the staff working document accompanying this report indicates that the number of allowances eligible Member States allocated for free to electricity generators in phase 3. Table 6.2 of Appendix 6 indicates the maximum number of allowances per year to be allocated under Article 10c.

The Article 10c allowances that remained unallocated from phase 3 could either be auctioned or, in line with the EU ETS Directive, allocated in phase 4 to Article 10c investments selected through competitive bidding or transferred to the Modernisation Fund. Figure 5 shows the extent to which Article 10c allowances from each year of phase 3 were allocated, auctioned or transferred to phase 4.

[43] The number of the Aricle 10c allowances included in Figure 4 can include allowances issued with a delay for previous years. The relevant amounts per year are indicated in the EUTL.

Figure 5. Distribution of the residual Article 10c allowances (allocated, auctioned, transferred to phase 4) [44]



Source: DG Climate Action

Overall, around 74% of available Article 10c allowances were allocated between 2013 and 2019. Most of the remaining allowances were auctioned, with only a small amount (about 0.5%) transferred to phase 4. The number of unallocated allowances auctioned (or planned for auction) by Member State under the Article 10c derogation in phase 3 is indicated in Table 6.3 of Appendix 6 to the accompanying staff working document.

Transitional free allocation under Article 10c of the EU ETS Directive continues to be available in phase 4, but with stronger provisions on transparency and with the option for eligible Member States to use all or part of their Article 10c allocation to support investments within the framework of the Modernisation Fund. Bulgaria, Romania and Hungary opted to continue to use Article 10c in phase 4[45], and are in the process of drawing up national frameworks to implement this provision. These need to be cleared by the Commission under State aid rules[46]. Other eligible Member States[47] chose to either auction their phase 4

[44] Figure 5 includes volumes to auction, up to and including the 2021 auctioning calendar. The allowances transferred from 2013 to phase 4 (912 630) were originally meant to be allocated to five Hungarian installations, which in 2014 were determinded ineligible to receive the allocation. On 27 September 2019, pursuant to Articles 10c(5) and 10d(4) of the revised EU ETS Directive, Hungary informed the Commission of its intention to use all 912 630 Article 10c allowances, which had not been allocated by 2020, for implementing the Article 10c derogation in phase 4.

[45] In line with Article 10c(2), any Member State intending to make use of optional transitional free allocation for the modernisation of the energy sector in phase 4 had to publish, by 30 June 2019, a detailed national framework and/or a list of small projects to be supported. Only Bulgaria, Hungary and Romania did so. In line with Article 10c(5), Member States could decide by 30 September 2019 to use unallocated free allocation from phase 3 for the optional transitional free allocation in phase 4 or to auction these allowances (see Table 6.3 of Appendix 6 to the accompanying staff working document).

[46] Guidelines on certain State aid measures in the context of the system for greenhouse gas emission allowance trading post 2021, OJ C 317, 25.9.2020, p. 5

[47] In phase 4, Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Romania are eligible to use the Article 10c derogation.

allowances or transfer them to the Modernisation Fund. The number of phase 4 allowances to be used under the Article 10c derogation, transferred to the Modernisation Fund, or auctioned is included in Table 6.4 of Appendix 6 to the staff working document accompanying this report.

3.1.5 NER 300 programme

In phase 3, the NER 300 was a large-scale funding programme for innovative low-carbon energy demonstration projects. The aim was to demonstrate environmentally safe carbon capture and storage and innovative renewable energy technologies on a commercial scale in the EU. The NER 300 was funded from the monetisation of 300 million allowances from the New Entrants' Rerserve (NER). Funding was awarded to projects selected following two rounds of call for proposals in December 2012 and July 2014.

In total, 38 renewable energy projects and one carbon capture and storage project in 20 Member States were awarded support from the NER 300, amounting to EUR 2.1 billion. By 30 June 2021, eight projects had become operational: the bioenergy project Verbiostraw in Germany, the onshore wind project Windpark Handalm in Austria, offshore wind projects Veja Mate and Nordsee One in Germany, the smart grid project Puglia Active Network in Italy, floating offshore wind projects Vertimed in France and Windfloat in Portugal, as well as the concentrated solar power project Minos in Greece. Two projects, the Italian bioenergy BEST and Swedish onshore wind project Windpark Blaiken, are considered completed[48].

A further four projects selected following the second call for proposals are advancing in their preparations. However, due to the COVID-19 pandemic, their launch dates were amended[49]. Given the difficulties to co-finance under the NER300 requirements together with a challenging economic and policy context, 23 projects were unable to raise sufficient additional funding and were withdrawn from the programme, releasing a total of almost EUR 1.5 billion.

In 2017, the amended NER 300 Decision[50] authorised the re-investment of the funds released from the projects cancelled under the first call for proposals (EUR 708.7 million) to projects supported under the existing financial instruments - the InnovFin Energy Demonstration Projects and the Connecting Europe Facility Debt Instrument, both managed by the European Investment Bank. These projects and their related pipelines are successfully demonstrating that the blending mechanism put in place is working efficiently. The full allocation of NER 300 undisbursed funds is expected by the end of 2022.

[48] Operational projects have entered into operation and are being implemented, while completed projects have finished operation.
[49] Commission Implementing Decision C(2021)1712 amending Implementing Decisions C(2012)9432 and C(2014)4493 as regards certain projects under the NER 300 funding programme, in particular those affected by the COVID-19 pandemic
[50] Commission Decision (EU) 2017/2172 of 20 November 2017 amending Decision 2010/670/EU as regards the deployment of non-disbursed revenues from the first round of calls for proposals, OJ L 306, 22.11.2017, p. 24

The remaining unspent funds from the second round of calls for proposals will be channelled to the Innovation Fund. So far, EUR 746.6 million has been transferred to the Innovation Fund.

Appendix 7 to the accompanying staff working document contains more information on the NER300.

3.1.6. Innovation Fund

The Innovation Fund under the EU ETS pools at least EUR 20 billion[51] for the period 2020-30, from the auctioning of 450 million allowances. This makes it one of the largest programmes in the world that aims to finance the commercial demonstration of innovative low-carbon technologies and industrial solutions to decarbonise Europe's energy-intensive industries, innovative renewables, energy storage, and carbon capture use and storage.

The Commission, together with the European Climate, Infrastructure and Environment Executive Agency, launched the first calls for proposals under the Innovation Fund in 2020. The calls attracted significant interest from companies of all sizes looking for funding for their innovative clean technology projects, across a variety of sectors and in all Member States, plus Iceland and Norway. Under the call for large-scale projects[52], the best-ranked 70 projects (out of 311 applications) were invited to submit a full proposal for the second stage by 23 June 2021. 66 full proposals were received, requesting about EUR 6 billion of support, against the total available funding under this call of EUR 1 billion. The results of the evaluation will be available in the fourth quarter of 2021.

The call for small-scale projects[53] closed on 10 March 2021 with 232 submissions received. 32 small-scale projects were selected for funding and invited to the grant preparation phase in July 2021, for a total volume of EUR 118 million. Successful projects are located in 12 Member States plus Iceland and Norway, and will reduce GHG emissions in both energy and industry sectors.

15 large-scale projects were selected for Project Development Assistance under the Innovation Fund for a total amount of EUR 4 million.

3.1.7. Modernisation Fund

The Modernisation Fund is the key funding instrument under the EU ETS set up with a view to supporting decarbonisation in central and eastern Member States[54]. It pools an approximate of EUR 25 billion[55], from the auctioning of over 643 million allowances[56] in phase 4.

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[51] The amount depends on the carbon price; the carbon price used here is EUR 40. In the package to deliver on the European Green Deal, the Commission proposes to increase substantially the volume of the Innovation Fund.
[52] Innovation Fund: call for large-scale projects
[53] Innovation Fund: call for small-scale projects
[54] The beneficiary Member States are Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovakia.
[55] The amount depends on the carbon price; the carbon price used here is EUR 40. In the package to deliver on the European Green Deal, the Commission proposes to increase the volume of the Modernisation Fund by an additional 2.5% of the cap.

The Modernisation Fund became operational in January 2021. In the first bi-annual dibursement cycle, six multiannual schemes were confirmed in Hungary, Poland and Czechia for a total volume of EUR 304 million. The schemes include investments in renewable energy, energy efficiency, smart grids, and developing power grids and energy communities.

Table 7.3 of Appendix 7 to the accompanying staff working document shows the total number of allowances per beneficiary Member State in phase 4.

3.1.8. Compensation of indirect carbon costs

In addition to free allocation covering direct emissions, Member States can grant State aid to compensate some electro-intensive industries for carbon costs arising from indirect emissions, i.e. from higher electricity prices due to power generators passing on the costs of buying allowances to consumers. To ensure a harmonised application of indirect carbon cost compensation between Member States and to minimise competition distortions in the internal market, the Commission adopted the EU ETS State aid Guidelines. The first edition of these Guidelines applied to the indirect costs incurred from 2013 to 2020[57]. It was subsequently revised to cover the period 2021-30[58].

This report details Member States' expenditure in 2020 for indirect costs incurred in 2019, under the first edition of the Guidelines. Data on the compensation for indirect costs incurred in 2020 is not available yet. Member States that choose to start or continue compensating for indirect costs incurred in 2021 and beyond, under the revised Guidelines, must notify their schemes to the Commission.

A growing number of Member States have started compensating for indirect costs. To date, the Commission has approved 16 schemes in 15 Member States. In 2020, Poland and Romania have started compensating indirect costs for the first time. The Commission approved a new Czech scheme[59] in November 2020 and a new Italian scheme[60] in July 2021. Both Czechia and Italy will start compensating indirect costs in 2021 (for costs incurred in 2020).

The EU ETS Directive specifies that within three months of the end of each year, Member States that have an indirect cost compensation scheme in place should make available to the public, in an easily accessible form, the total amount of compensation provided and a breakdown per recipient sector and subsector. Table 4 below presents a summary of the data published by the Member States for compensation paid out in 2020 for indirect costs incurred in 2019. These are compared to the auction revenues in 2019.

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[56] This volume includes transfers made to the Modernisation Fund by Member States from the pools of allowances under Articles 10(2b) and 10c of the EU ETS Directive. The intial volume of the Modernisation Fund amounts to nearly 276 million allowances (See Table 7.3 of Appendix 7 to the accompanying staff working document).
[57] Guidelines on certain State aid measures in the context of the greenhouse gas emission allowances trading scheme post 2012, OJ C158, 5.6.2012, p. 4
[58] Guidelines on certain State aid measures in the context of the system for greenhouse gas emission allowance trading post 2021, OJ C 317, 25.9.2020, p. 5
[59] SA.58608
[60] SA.60787

Table 4. Indirect carbon cost compensation paid out by EU Member States and the UK in 2020[61]

Member State	Compensation disbursed in 2020 for indirect costs incurred in 2019 (in million euros)	Number of beneficiaries (installations)	Auction revenues in 2019 (excl. aviation allowances, in million euros)	Percentage of auction revenues spent on indirect cost compensation
DE	546	902	3146.1	17.4%
BE (FL)	89.4	108	353.5	30.9%
BE (WL)	20	31		
NL	110.1	93	435.6	25.3%
EL	42.2	48	503.3	8.3%
LT	0.66	1	83.7	0.7%
SK	4	10	244.4	4.1%
FR	266.4	302	711.6	37.4%
FI	74.6	61	217.4	34.3%
ES	61	204	1225.2	5.0%
LU	10.6	4	16.8	63.0%
PL	76.6 (340.9 PLN)	25	2545.9	3%
RO	N.A.	44	747.9	N.A.
UK	57.25 (50.9 GBP)	61	N.A.	N.A.

The total indirect cost compensation paid out by 13 Member States in 2020 for costs incurred in 2019 amounted to at least EUR 1.358 million - more than double the amount paid out in 2019 (for costs incurred in 2018). This sizable increase was primarily related to the increase in carbon prices. The majority of schemes do not have a fixed budget but compensate based on actual indirect costs incurred. Moreover, the formula to calculate compensation laid down in the State aid Guidelines specifies that Member States must use the average allowance forward price of year t-1 when calculating disbursed compensation. This means that forward prices from 2018 are used to calculate the compensation for indirect costs incurred in 2019. Between 2018 and 2019, the carbon price used as basis for the compensation rose from around EUR 6 to around EUR 16.

One of the transparency provisions in the EU ETS Directive specifies that Member States spending more than 25% of their auction revenues on indirect cost compensation in any year must publish a report setting out the reasons why this amount was exceeded. In 2020, at least five Member States exceeded the 25% limit, while in 2019 no Member State had done so. Moreover, the average share of total compensation compared to total auction revenues increased significantly: up to 13.7% in 2020 against 7.9% in 2019.

[61] The Commission did not receive full data on indirect cost compensation for Romania. As for the UK, no auction revenues are included since no allowances were auctioned in 2019 on behalf of the UK in accordance with the safeguard measures adopted 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.

As carbon prices rise, both auction revenues and indirect cost compensation increase; therefore, the relative share should remain similar. In 2019, however, higher carbon prices did not translate into higher auction revenues, because it was the first year that the MSR reduced the volume of auctioned allowances. Some 30% fewer allowances were auctioned in 2019 than in 2018. When comparing indirect costs incurred in 2019 and 2018 (compensation paid out in 2020 and 2019 respectively), it is thus important to take into account the fact that future carbon prices are used to determine compensation amounts. Since the average t-1 price rose stronger than the auction revenues, the relative share of compensation compared to auction revenues increased as well.

The reduction of auction revenues is the main reason quoted by Member States to explain the higher share of auction revenues spent on indirect carbon cost compensation in 2020. Comparing the auction revenues of the 10 Member States that granted compensation in both 2019 and 2020 (for the costs incurred in 2018 and 2019 respectively) shows that the revenues decreased by around 4.2% due to the MSR reducing auction volumes. Another reason is that some Member States have a relatively high share of electro-intensive industries, and hence a relatively high amount of indirect cost compensation. As these industries are not direct emitters of CO_2, they do not play a role in the division of auction revenues between Member States, which is based on historical emissions. Last, Member States with historically low emissions due to a relatively low-carbon energy mix have a tendency to show relatively elevated shares of auction revenues used for indirect cost compensation.

It can therefore be concluded that the higher compensation amounts in 2020 are linked to increasing carbon prices. The fact that compensation shares increased can be explained by the use of the forward carbon price to determine compensation and by auction revenues decreasing due to the MSR reducing auction volumes.

3.1.9. International credits

In phase 3, participants in the EU ETS could use international credits from the Kyoto Protocol's Clean Development Mechanism and Joint Implementation towards fulfilling part of their EU ETS obligation. These credits are financial instruments that should represent a tonne of CO_2 removed or reduced from the atmosphere as a result of an emissions reduction project. Participants could use international credits until the end of the 2020 compliance cycle[62], subject to qualitative and quantitative standards. Credits were not surrendered directly, but exchanged for EU ETS allowances.

At the start of phase 3, market analysts estimated that the quantity of international credit entitlements used over phases 2 and 3 (2008-2020) would amount to approximately 1.6 billion credits. As of 1 May 2021[63], the total number of international credits used or exchanged amounted to around 1.57 billion, almost 98% of the estimated maximum. The

[62] Clean Development Mechanism and Joint Implementation projects generate Kyoto carbon credits: Certified Emission Reductions and Emission Reduction Units respectively.
[63] The exchange of international credits was possible until the end of April 2021, i.e. the end of the 2020 compliance cycle.

total number of international credits exchanged throughout phase 3 only amounted to approximately 506 million.

For a full overview of the international credits surrenders and exchange, see Tables 8.1, 8.2 and 8.3 of Appendix 8 to the staff working document accompanying this report.

In line with the EU ETS Directive, international credits may no longer be used for EU ETS compliance as of the 2021 compliance cycle. This ensures that emissions are reduced domestically, safeguarding the environmental integrity of the system and that over-supply is curbed preserving its cost-efficiency.

3.2. Demand: allowances taken out of circulation

3.2.1. Emissions reductions

Since the start of phase 3 in 2013, emissions from stationary installations covered by the EU ETS (power plants and manufacturing installations) fell by almost 29% contributing to the overall decrease of around 43% since the system was set up in 2005.

In 2020, verified emissions from stationary installations amounted to 1.355 million tonnes of CO_2eq, a decrease of 11.4% compared to 2019, based on the information recorded in the EU Registry. As demonstrated in Table 5, the decrease in emissions was driven mostly by electricity and heat production, where emissions fell by over 15% compared to 2019, reflecting both reduced electricity consumption due to the COVID-19 pandemic and the previously observed decarbonisation trends. These include both a switch from coal to natural gas-fired power generation, and a replacement of fossil fuels by renewable energy sources. Emissions from industrial installations decreased by 7%, which was the largest single decrease since the beginning of phase 3, and GDP in EU27 decreased by 6% due to pandemic.

Table 5. Verified emissions from stationary installations (in million tonnes CO_2eq)[64]

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Verified total emissions	1 904	1 867	1 908	1 814	1 803	1 751	1 755	1 683	1 530	1355
Change from year x-1		-2.0%	2.2%	-4.9%	-0.6%	-2.9%	0.2%	-4.1%	-9.1%	-11.4%
Verified emissions from electricity and heat production	1 261	1 254	1 191	1 100	1 091	1 046	1036	964	822	696
Change from year x-1		-0.5%	-5.0%	-7.7%	-0.8%	-4.1%	-1.0%	-7.0%	-14.7%	-15.3%
Verified emissions from industrial installations	643	613	717	714	712	704	719	719	708	659
Change from year x-1		-4.7%	17.0%	-0.4%	-0.3%	-1.1%	2.0%	0.1%	-1.6%	-7.0%
Real GDP growth rate EU27 + the UK	1.8%	-0.4%	0.3%	1.8%	2.3%	2.0%	2.6%	2.0%	1.6%	-6%[65]

Source: EUTL, GDP data as reported on Eurostat (table code: tec00115, accessed in July 2021). Verified aviation emissions are reported separately in Chapter 4.

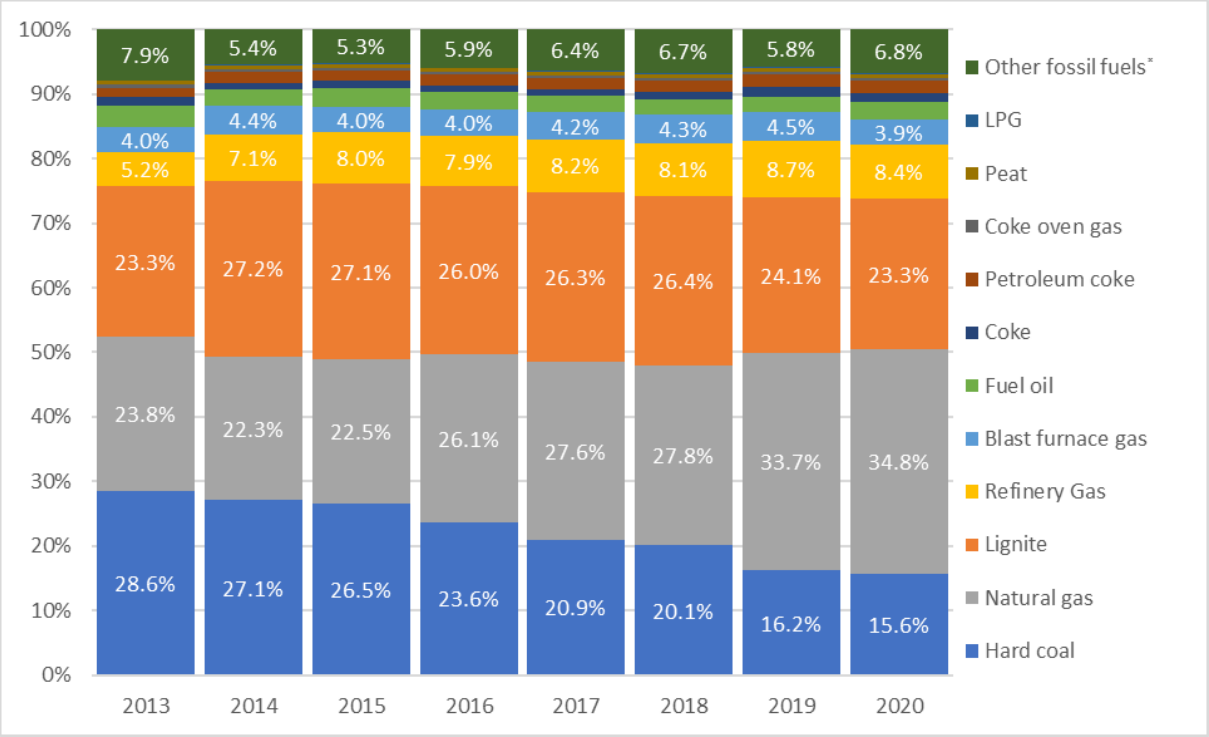
[64] Figures for EU27 + the UK + Iceland, Liechtenstein and Norway. The categorisation into electricity and heat production and industry in Table 7 is based on the NACE classification from the 2020 submission by Member States of their National Implementation Measures pursuant to Article 11 of the EU ETS Directive.

[65] This percentage reflects only the GDP growth rate in EU27, as EU27 + the UK data for 2020 is not available. The rest of the growth rates up to 2019 reflect EU27 + the UK.

Lower emissions in 2020, also reflecting the effect of COVID-19 pandemic, lowered the demand for allowances, which had an impact on the overall surplus of allowances in the EU carbon market, leading to a slight increase in comparison to 2019 (See Chapter 3.2.2).

As shown in Figure 6, throughout phase 3, the most important energy source streams were hard coal, lignite (and sub-bituminous coal) and natural gas. These three groups together represent about 75% of fossil fuel emissions in each year, but the share of hard coal is clearly decreasing, while the share of natural gas is rising. This was more pronounced in 2019 and 2020 - emissions from hard coal represented a share of only 16% of total emissions in these two years (down compared to 29% in 2013), 2020 emissions from natural gas amounted to 35% (up compared to 24% in 2013), whereas emissions from lignite fell slightly from their peak of 27% in 2014 to 23% in 2020. Similar to earlier years, in the last year of phase 3, other significant energy sources included mainly refinery gas (and other process-derived gases) and other fossil fuel types, accounting for 8.4% and 6.8% of the total reported combustion emissions respectively.

Figure 6. Share of emissions by fuel type (% of total fuel emissions in the EU ETS, labels not shown if fuel never exceeds 3% of the total), [*] not covered by the other specified fuels[66]



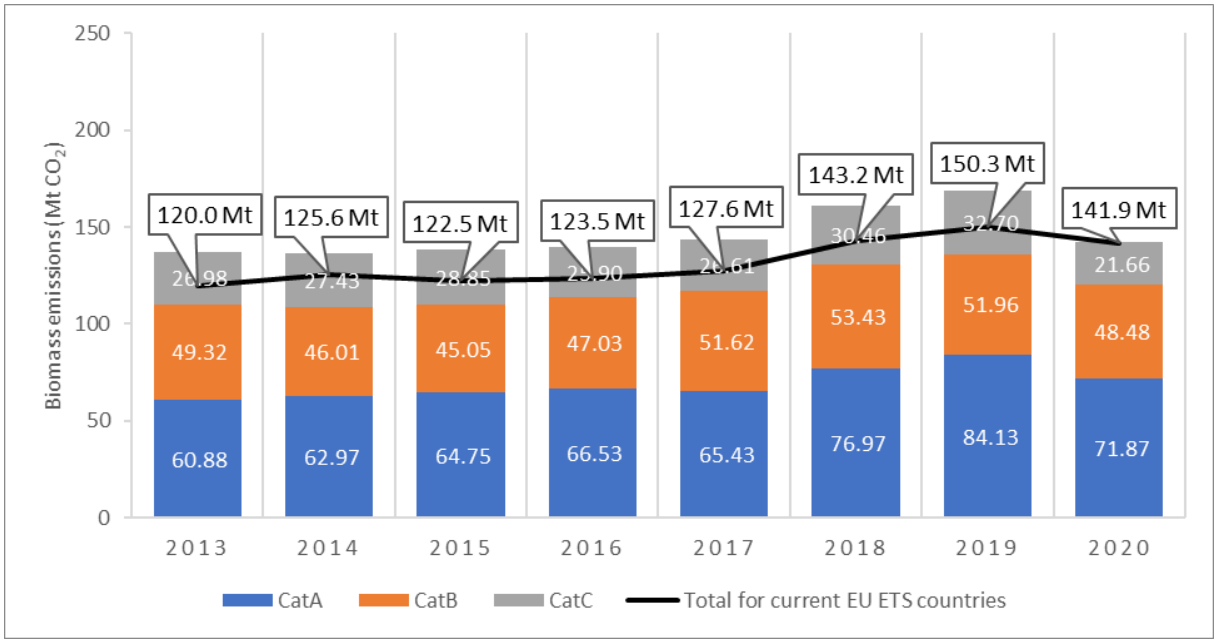
Based on the 2021 Article 21 reports submitted by Member States[67], the zero-rated emissions from biomass decreased from 150 Mt in 2019 to 142 Mt in 2020, a similar level as in 2018. 2 163 out of 9 623 installations (22.5% of all reporting installations under the EU ETS) reported the use of biomass. The total biomass emissions in 2020 are about ten times lower

[66] The UK data is included up to 2019. In 2020, only Northern Ireland data is included. The UK did not submit an Article 21 report in 2021.
[67] The UK did not submit an Article 21 report in 2021.

than the fossil fuels emissions of EU ETS sectors. Emissions from non-zero-rated biomass are still minimal, at about 0.9 Mt CO_2eq and accounting for less than 0.1% of total EU ETS emissions.

From 1 January 2022, the new sustainability and GHG emissions savings criteria under the Directive 2018/2001 (Renewable Energy Directive)[68] will apply in the EU ETS to zero-rated biomass emissions. This will strengthen the current criteria on biofuels and bioliquids in the EU ETS, and will add new criteria for solid and gaseous biomass. Figure 7 distinguishes between category A, B and C installations[69] and shows emissions originating from biomass reported in phase 3. It excludes the absorption phase and the net value of emissions.

Figure 7. Emissions originating from zero-rated biomass in phase 3 of the EU ETS (2013-20) (in million tonnes CO_2eq)[70]



A breakdown of phase 3 verified non-CO_2 emissions from stationary installations by the type of GHG (N_2O and PFCs) is provided in Table 9.1 of Appendix 9 to the accompanying staff working document.

In 2020, 92 812 allowances were cancelled on a voluntary basis. In phase 3 in total, voluntary cancellations of 498 435 allowances were recorded by the end of June 2021. Most of the cancellations in phase 3 were authorised by account holders in the Registries of Germany, Sweden, Norway, the Netherlands and the UK.

[68] 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, OJ L 328, 21.12.2018, p. 82

[69] Category C installations emit more than 500 000 tonnes CO_2eq per year, category B installations emit between 500,000 and 50 000 tonnes CO_2eq per year, and category A installations emit less than 50 000 tonnes CO_2eq per year. Installations with low emissions are a subset within category A installations, which emit less than 25,000 tonnes CO_2eq per year.

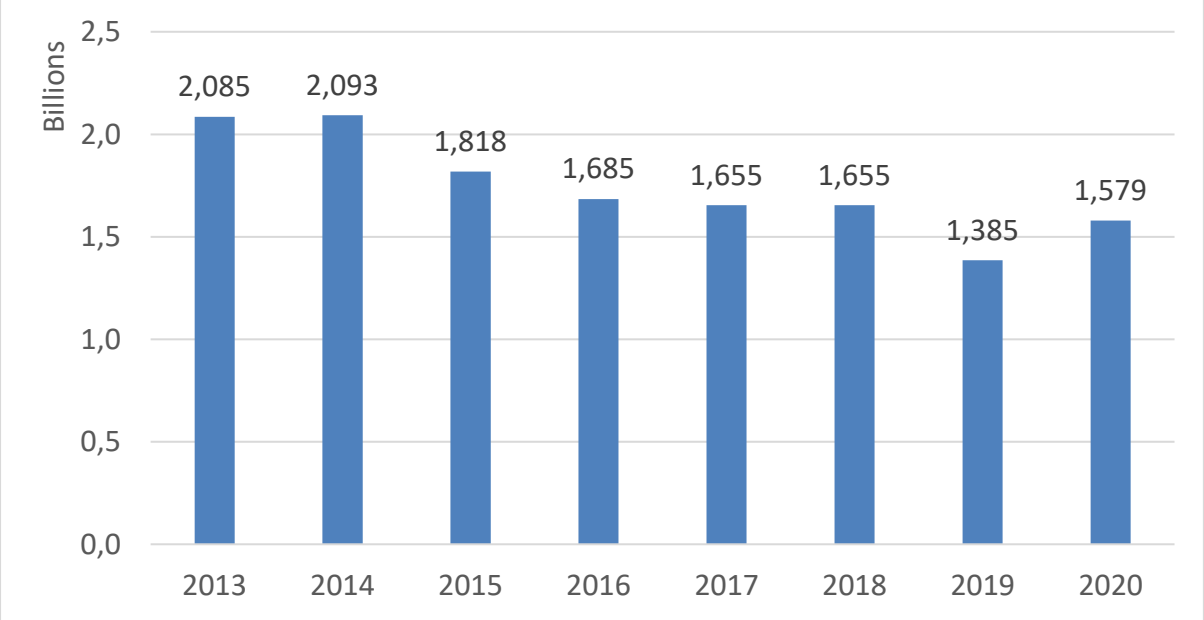
[70] The table contains the UK data up to and including 2019. The line shows the total biomass emissions in the current scope of the EU ETS, while the bars include the UK. The totals displayed in the labels cover the current EU ETS scope without the UK.

3.2.2. Balancing supply and demand

At the start of phase 3, the EU ETS had a high structural imbalance between the supply and demand of allowances, equalling 2.1 billion allowances. To address this imbalance, as a short-term measure, in 2014 the Commission postponed the auctioning of 900 million allowances from 2014, 2015, and 2016 to 2019-2020, and as a long-term solution created the MSR in 2015[71]. The MSR adjusts auction volumes according to predefined thresholds of the total number of allowances in circulation (TNAC) so as to maintain the carbon market in balance.

From 2018 to 2019, when the MSR began operating, the surplus fell significantly from 1.65 billion to around 1.385 billion allowances. In 2020, due to lower demand, the surplus increased to 1.579 billion allowances. The additional 2020 surplus is expected to be absorbed over the next two to four years. Figure 8 presents the development of the surplus in the European carbon market until 2020.

Figure 8. Surplus of allowances in phase 3 of the EU ETS (2013-20)



Source: DG Climate Action

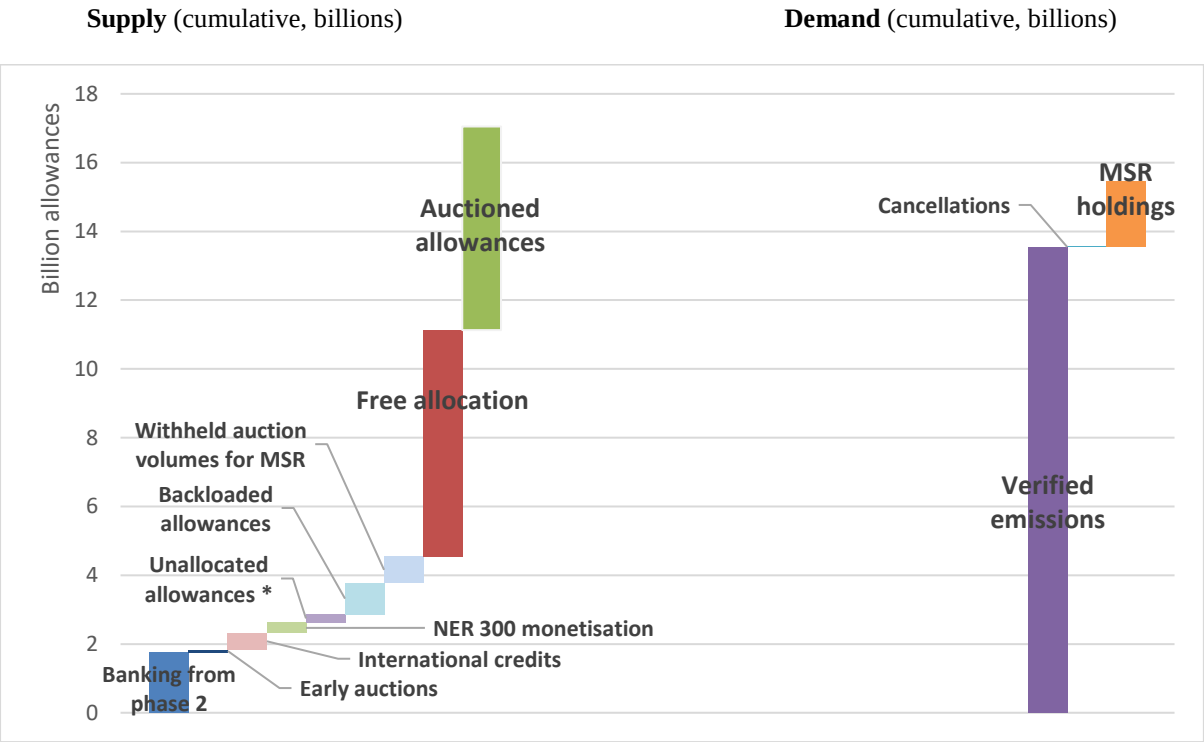
When the EU ETS was revised in 2018[72], major changes were made to the functioning of the MSR, as shown in Figure 10.1 of Appendix 10 to the staff working document accompanying this report.

[71] Decision (EU) 2015/1814 of the European Parliament and of the Council of 6 October 2015 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and amending Directive 2003/87/EC, OJ L 264, 9.10.2015, p. 1.

[72] Directive (EU) 2018/410 of the European Parliament and of the Council of 14 March 2018 amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments and Decision (EU) 2015/1814, OJ L 76, 19.3.2018, p. 3

This report consolidates supply and demand figures, published according to the timeline of reporting obligations stemming from the EU ETS Directive and its implementing provisions. Figure 9 shows the composition of cumulative supply and demand in 2020. The relevant data were also published in the Commission's communication on the TNAC for MSR purposes.[73]

Figure 9. Cumulative supply and demand in the EU ETS as at the end of 2020



Source: DG Climate Action (*The final figure of the allowances not allocated to installations pursuant to Article 10a(7) of Directive 2003/87/EC and allowances not allocated to installations because of the application of Article 10a(19) and (20) of that Directive was not yet available at the time of finalising this report.)

In preparation for the MSR to become operational in 2019, the Commission regularly published the TNAC for the preceding year, starting mid-May 2017[74]. In May 2021, the TNAC was published for the fifth time, corresponding to 1 578 772 426 allowances[75]. Once again, the communication leads to the placement of allowances in the MSR, reducing the auction volume in 2021 and 2022.

Based on the functioning of the EU ETS in 2020 and 2021, the TNAC and the revised legislation, the auction volumes in 2021 were reduced by nearly 40%, close to 320 million allowances. The auction volumes in 2022 will be reduced in a similar manner. Table 10.1 of Appendix 10 to the accompanying staff working document provides information on the contributions to the MSR by Member State since it became operational in 2019 until the end of 2021.

[73] C(2021)3266 final
[74] C(2017)3228 final
[75] C(2021)3266 final

In 2021, the Commission carried out the first review of the MSR[76], as part of the broader initiative to strengthen the EU ETS.[77] It showed that the MSR has been fulfilling its purpose to reduce the surplus of allowances and stabilise the EU carbon market, even during the COVID-19 pandemic.

The MSR has begun to address historical imbalances in 2019, leading to intakes of nearly 1 billion allowances. This includes an adjustment of 264 million allowances withdrawn from auction volumes in 2019, 397 million allowances withdrawn from auction volumes over 2019-2020, and over 300 million allowances to be withdrawn from auction volumes over 2020-2021, representing 24% of the previous year's surplus in each case. Reduced emissions in 2020 due to the COVID-19 crisis will result in a higher MSR intake over the period 2021-2022, of 379 million allowances.

Intakes to the MSR are expected to continue reducing the auction supply in the coming years, with the surplus remaining above the upper threshold and the aftermath of the COVID-19 pandemic affecting the demand. The MSR will thus continue to address the historical imbalance built up in the EU carbon market over phases 2 and 3 while simultaneously responding to the impact of the demand shock caused by the pandemic.

4. AVIATION

The aviation sector has been part of the EU ETS since 2012. The original legislation covered all flights outgoing and incoming to the EEA. However, the EU temporarily limited ETS obligations to flights within the EEA operated by all nationalities of airlines, in order to support the development of a global market-based measure by the International Civil Aviation Organisation (ICAO) to reduce aviation emissions.

In October 2016, the ICAO Assembly agreed on a resolution on CORSIA, to start in 2021. CORSIA is a carbon offsetting scheme with the objective of stabilising net emissions from international aviation at fixed levels through the purchase and cancellation of international credits. In light of this agreement, the EU ETS Directive was amended in 2017 to extend the intra-EEA scope of the EU ETS for aviation until the end of 2023.

As a result of the Agreement between the EU and Switzerland to link their respective carbon markets (See Chapter 7), from 1 January 2020 the aviation scope of the EU ETS is extended to all departing flights from the EEA to Switzerland. Switzerland in turn applies its ETS to all flights departing to EEA airports. This ensures a level playing field on both directions of routes.

[76] The Impact Assessment can be found in Annex 7 of SWD(2021)601 final.
[77] Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and Regulation (EU) 2015/757, COM/2021/551 final and Proposal for a Decision of the European Parliament and of the Council amending Decision (EU) 2015/1814 as regards the amount of allowances to be placed in the market stability reserve for the Union greenhouse gas emission trading scheme until 2030, COM/2021/571 final

Based on the Trade and Cooperation Agreement between the EU and the UK, reached in December 2020 and applicable as of 1 January 2021, the EU ETS also continues to apply to flights from the EEA to the UK, while the new UK ETS applies to flights departing from the UK to the EEA.

In 2020, allowances were issued in line with the intra-EEA scope of the EU ETS for aviation, extended to Switzerland. The free allocation amounted to slightly over 32.5 million allowances. This includes the free allocation (slightly over 31.7 million allowances) and nearly 0.8 million free allowances allocated from the special reserve for new entrants and fast growing operators. In addition, aircraft operators administered by national administrators in the EEA received about 0.5 million Swiss aviation allowances for free under the Swiss ETS.

The volume of aviation allowances auctioned in 2020 was approximately 9.2 million.

In phase 3 of the EU ETS (2013-20), aviation emissions had risen year-on-year until 2020, when this trend was reversed by the COVID-19 pandemic. Between 2013 and 2019, emissions from flights covered by the EU ETS rose by 27.5%. In 2020, verified emissions of aircraft operators administered by the EEA states fell sharply by 63% compared to 2019 due to the pandemic and the related travel restrictions, reaching 24.9 million tonnes of CO_2 under the EU ETS and 0.3 million tonnes under the Swiss ETS (25.2 million tonnes of CO_2 in Table 6 below). This meant that 2019 was the year with the highest aviation emissions to date. Table 6 shows a summary of verified emissions, free allocation and auction volumes for the aviation sector since the start of phase 3**.**

Table 6. Aviation sector: verified emissions, free allocation and auction volumes, 2013-2021 (in millions)

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Verified emissions (in million tonnes CO_2 eq)	84	53.5	54.8	57.1	61.5	64.4	67.5	68.2	25.2[78]	
Change of verified emissions to year x-1		-[79]	2.5%	4.1%	7.7%	4.8%	4.8%	1%	-63%	
Free allocation (EU27 + the UK + Iceland, Liechtenstein and Norway + Switzerland for 2020 and 2021)[80]	173.8	32.4	32.4	32.1	32.0	33.1	31.3	31.3[81]	32.5[82]	17.3[83]

[78] Including 0.3 million tonnes under the Swiss ETS.
[79] Due to the different scope of the EU ETS, the change cannot be compared to the previous year.
[80] 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, neither the returns in 2012 due to the scope change.

Free allocation from special reserve for new entrants and fast growing operators	0	0	0	0	0	1.1	1.1	1.0	0.8	0.3
Volumes of allowances auctioned	2.5	0	9.3	16.4	6.0	4.7	5.6	5.5	9.2	1.3[84]

Sources: EUTL, DG Climate Action

The volumes of aviation allowances auctioned over the period 2013-2015 reflect the 2014 co-legislators' decision to 'stop the clock'[85] and limit climate obligations only to flights within the EEA. Compliance for the aviation sector was postponed for 2013[86]. For aviation emissions from 2013 and 2014, compliance took place between January and April 2015.

Including the aviation sector in the EU ETS had a significant impact on the environmental performance of the system as a whole in phase 3. By 2020, aircraft operators had surrendered 308 million aviation allowances and 139 million general allowances. The latter figure shows that the aviation sector had to buy high volumes of allowances from stationary installations, thus contributing to the overall stringency and ambition of the EU ETS.

The significant impact of COVID-19 on international aviation also had repercussions on CORSIA. Global aviation emissions in 2020 fell to below 54% of 2019 levels.[87] In light of this impact, the aviation industry, supported by numerous ICAO participating countries, successfully requested adjusting CORSIA's baseline from the original 2019-20 average of emissions to 2019 emissions for the pilot phase (years 2021-23). Since the aviation industry is not expected to recover before 2023[88] (return to 2019 traffic levels), there would likely be no or few offsetting obligations for airlines during the CORSIA pilot phase.

The EU ETS Directive requires the Commission to report to the European Parliament and to the Council on the general ambition and overall environmental integrity of CORSIA. Article 3d of the Directive requires the Commission also to 'study the ability of the aviation sector to pass on the cost of CO_2 to its customers with the intention to propose to increase the percentage of auctioning'.

[81] Taking into account the numbers withheld due to closures of aircraft operators, the real allocation for 2019 would be 4 million below the presented figure (see footnote 8 in Notice C/2020/8643, OJ C 428, 11.12.2020, p. 1). Allocation for the UK (4.31 million allowances of the total for 2019) 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, resumed in 2020.
[82] This number takes into account departing flights from EEA to Switzerland, and between the EEA and the UK, in accordance with the Withdrawal Agreement.
[83] This number does not take into account the departing flights from EEA to the UK yet, which are part of the EU ETS in accordance with the Trade and Cooperation Agreement between the EU and the UK.
[84] Until the end of June 2021.
[85] 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, p. 1
[86] Regulation (EU) No 421/2014 of the European Parliament and of the Council of 16 April 2014, OJ L 129, 30.4.2014, p. 1
[87] ICAO, C-WP/15209 of May 2021
[88] Eurocontrol, COVID-19 impact on the European air traffic network of September 2021

As part of the broader package to deliver on the European Green Deal published on 14 July 2021, and based on the EU ETS Directive as amended in 2017[89], the Commission proposed to amend the EU ETS for aviation[90]. This proposal, in its accompanying impact assessment[91], includes a report on the CORSIA assessment and the cost-pass through study. It seeks to implement CORSIA into EU law in a way that is consistent with the EU's 2030 climate objective.

5. MARKET OVERSIGHT

During phase 3 of the EU ETS (2013-20), a robust legal framework has been put in place to oversee the EU carbon market. Derivatives in emission allowances were classified as financial instruments from the start of the EU ETS. However, since January 2018, spot[92] emission allowances are also classified as financial instruments under the Directive on Markets in Financial Instruments[93] (MiFID). The classification of emission allowances has been reflected in a number of secondary legislation acts, including the Auctioning Regulation[94], to oversee the primary market (auctions). Therefore, all trading in emission allowances is effectively subject to the same regime applicable to EU financial markets.

The main financial market rules that apply to the trading of emission allowances are:

- **Markets in Financial Instruments Directive and Regulation (MIFID II/MIFIR),** which sets out authorisation requirements for trading venues and financial intermediaries (investment firms), important reporting and transparency requirements to avoid market abuse and rules on supervision and cooperation between national competent authorities.
- **Market Abuse Regulation[95]**, which is the EU's rulebook that prohibits different kinds of market abuse, such as insider dealing or market manipulation through practices like spreading false information or rumours. The Market Abuse Regulation applies to all market participants, irrespective of whether the abuse takes place in the EU or outside the EU.

[89] Regulation (EU) 2017/2392 of the European Parliament and of the Council of 13 December 2017 amending Directive 2003/87/EC to continue current limitations of scope for aviation activities and to prepare to implement a global market-based measure from 2021, OJ L 350, 29.12.2017, p. 7

[90] Proposal for a Directive of the European Parliament and of 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, COM/2021/552 final

[91] The Impact Assessment can be found in SWD(2021)603 final.

[92] Contracts under which the delivery of allowances takes place (almost) immediately.

[93] 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, p. 349

[94] 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, p. 1

[95] Regulation (EU) No 596/2014 of the European Parliament and of the Council of 16 April 2014 on market abuse (the 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, p. 1

- **Anti-Money Laundering Directive**[96], which lays down important safeguards against money laundering and terrorist financing.

The market is supervised by the financial authorities of 27 Member States[97], under the coordination of the European regulator, the European Securities and Markets Authority (ESMA). In line with financial market rules, trading venues and investment firms are subject to robust reporting and transparency requirements. This enables the competent authorities in Member States to monitor the trading behavior of market participants. In addition, the Market Abuse Regulation obliges market participants to report suspicious orders and transactions without delay. The national authorities have the power to impose remedial action or penalties when they decide that certain behaviours give rise to market abuse.

Financial market rules are an important safeguard of the integrity and transparency of the EU carbon market. So far, the established framework has worked well and it is essential to ensure that the rules are implemented properly.

Every year, ESMA publishes an estimate of the size of different European markets, including the carbon market. In the most recent estimate for 2020, ESMA calculated the overall trading activity in emission allowances at around EUR 687 billion[98]. Of this total, derivatives of emission allowances represent by far the largest share of the market. Most transactions take place on trading venues (approx. 95%), with only a small share conducted over-the-counter (OTC).

Derivatives play a crucial role as they provide ETS operators with flexible ways to manage their carbon price risk. These contracts are offered by exchanges and financial intermediaries, which are free to 'package' emission allowances in different financial products, subject to market preferences and the established legal framework.

As in all markets, the EU carbon market also felt the effects of the COVID-19 pandemic in 2020. In the wake of the crisis, the price of emission allowances dipped to EUR 14.71 from the average level of EUR 24.84 in 2019[99]. Nevertheless, carbon prices rebounded swiftly. Market analysts have pointed out that the Market Stability Reserve (MSR) significantly improved the resilience of the market to major demand shocks, such as the shock caused by the global pandemic.

There are many factors that can influence the price of emission allowances[100]. In particular, leading market analysts point out the MSR, which is absorbing the market surplus, and long-

[96] Directive (EU) 2015/849 of the European Parliament and of the Council of 20 May 2015 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing, amending Regulation (EU) No 648/2012 of the European Parliament and of the Council, and repealing Directive 2005/60/EC of the European Parliament and of the Council and Commission Directive 2006/70/EC, OJ L 141, 5.6.2015, p. 73

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

[98] ESMA's opinion on ancillary activity – market size calculation – update for the year 2020.

[99] Price on 23 March 2020 (EUR 14.71).

[100] Some short-term factors are gas and oil prices, weather conditions, renewable energy generation, scheduling of auctions and free allocation, etc.

term policy expectations of market players. The carbon market is forward-looking and anticipates future legislative changes. The increased 2030 climate ambition, enshrined in the European Climate Law, requires a lower EU ETS emissions cap, which would reduce the supply of allowances. According to analysts, market participants are already factoring in this expected change.

ETS compliance entities remain the dominant category on both the primary and secondary market. The number of bidders eligible for the auctions at the common auction platform increased slightly to reach 90 participants as of December 2020. The vast majority of participants were operators (72%), while the remainder were investment firms and credit institutions (18%), as well as persons exempt from MiFID requirements (10%)[101].

On the secondary market, MiFID rules require trading venues and investment firms to report to competent authorities the positions held in emission allowances. The aggregate breakdowns of positions in emission allowances held by different market participants, including investment firms, are also publicly available and published on a weekly basis on the webpages of ESMA[102]. These reports provide a good indication of the distribution of the volumes between market participants and show that investment funds, which can be associated with speculative behaviour, currently hold a small share of the total positions on the market.

The start of the phase 4 was marked by a significant change on the secondary market. Historically, the major share of secondary market trading took place on the UK-based exchange platform ICE Futures Europe. On 7 June 2021, ICE London moved the trading in EU emission allowances (both spot and derivatives) to its subsidiary in the Netherlands, ICE Endex. Trading on ICE Endex is subject to the supervision of the Dutch Authority for the Financial Markets.

The increase in energy prices in 2021 has renewed the interest in carbon prices and the oversight regime of the EU carbon market. There is common agreement that the main cause of the increase are the record global prices of gas, while the increased price of carbon has a much smaller effect. The Commission's communication of 13 October 2021[103] demonstrates that the effect of the gas price increase on the electricity price is nine times bigger than the effect of the carbon price increase. Fair price formation and integrity of the EU carbon market is guaranteed by a robust oversight regime also applicable to other financial markets. Nevetheless, the Commission announced that it will ask ESMA to further enhance the monitoring of developments in the EU carbon market.

[101] This concerns a separate category defined in MiFID, for companies that deal in financial instruments, but on an ancillary basis (as minor part of their overall business activity).
[102] Commodities Derivatives Weekly Position Reporting System
[103] Communication from the Commission to the European Parliament, the European Council, the European Economic and Social Committee and the Committee of the Regions, Tackling rising energy prices, a toolbox for action and support, COM/2021/660 final

6. MONITORING, REPORTING AND VERIFICATION OF EMISSIONS

For phase 3 (2013-20) and beyond, the monitoring, reporting, verification and accreditation requirements of the EU ETS are harmonised in the Monitoring and Reporting Regulation (MRR)[104] and the Accreditation and Verification Regulation (AVR)[105].

The monitoring system in the EU ETS is designed as a building block approach, which gives operators a high degree of flexibility to ensure cost-efficiency, while achieving a high reliability of the emissions data monitored. For this purpose, operators may use several monitoring methods ('calculation-based' or 'measurement-based' as well as, by exception, 'fall-back approaches'), 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 parameter to be calculated for the flights covered by the EU ETS. The requirement for installations and aircraft operators to have a monitoring plan approved by the relevant competent authority on the basis of the MRR prevents them from making an arbitrary selection of monitoring methods and temporal variations (For a detailed overview of the monitoring applied in the EU ETS participating countries, see Chapter 11.1 of Appendix 11 of the accompanying staff working document).

The AVR put in place an EU-wide harmonised approach to the accreditation of verifiers. Verifiers must be accredited by a National Accreditation Body in order to carry out verifications in compliance with the AVR. This uniform accreditation system allows verifiers to operate with mutual recognition across all participating countries, thereby taking full advantage of the internal market and ensuring sufficient availability across the EU (For a detailed overview of AVR implementation in the EU ETS participating countries, see Chapter 11.2 of Appendix 11 to the accompanying staff working document).

Following the first update of the MRR and the AVR in 2018 to improve, clarify and simplify the monitoring, reporting, verification and accreditation rules and improve the efficiency of the system, a second update of the two regulations started in February 2019. The aim was to address outstanding issues such as the implementation of the recast of the Renewable Energy Directive. This resulted in the adoption of the Commission Implementing Regulation 2020/2085 amending the MRR[106] and the Commission Implementing Regulation 2020/2084 amending the AVR[107] on 14 December 2020.

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[104] 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, p. 1

[105] 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, p. 94

[106] Commission Implementing Regulation (EU) 2020/2085 of 14 December 2020 amending and correcting Implementing Regulation (EU) 2018/2066 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and the Council, OJ L 423,15.12.2020, p. 37

[107] Commission Implementing Regulation (EU) 2020/2084 of 14 December 2020 amending and correcting Implementing Regulation (EU) 2018/2067 on the verification of data and on the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and the Council, OJ L 423, 15.12.2020, p. 23

Countries participating in the EU ETS take different approaches to the competent authorities in charge of implementation. In some countries, several local authorities are involved, while in others, implementation is more centralised (For a detailed overview of administrative arrangements in the EU ETS participating countries, see Chapter 11.3 of Appendix 11 to the accompanying staff working document). Overall, the organisation of the EU ETS administration in the participating countries has proven largely effective throughout phase 3.

Regarding compliance measures, the EU ETS Directive provides for a EUR 100 penalty (indexed to inflation) for each tonne of CO_2 emitted for which no allowance has been surrendered in due time, in addition to the price of surrendering. Other penalties applicable to infringements in implementing the EU ETS are based on national provisions set by each concerned country (For a detailed overview of the EU ETS compliance in participating countries, see Chapter 11.4 of Appendix 11 to the accompanying staff working document).

The efficiency of the compliance system has improved since the MRR allowed countries to make electronic reporting mandatory. Throughout phase 3, more than half of the EU ETS participating countries reported the use of electronic templates for monitoring plans, emissions reports, verification reports and/or improvement reports. The other half reported that they use some form of automated IT system for EU ETS reporting.

Throughout phase 3, and despite the difficult economic situation due to the COVID-19 crisis affecting the 2020 and 2021 compliance cycles, the level of compliance with the EU ETS remained consistently very high. Operators responsible for over 99% of emissions from stationary installations and aviation in most years, met their legal obligations.

7. LINK OF THE EU ETS AND THE SWISS ETS

The negotiations on linking the EU ETS with the carbon market of Switzerland were concluded during the 21st Conference of the Parties to the UNFCCC in December 2015. Based on Council Decision (EU) 2017/2240[108], the Linking Agreement[109] was signed, provisionally applied from 23 November 2017 and approved on behalf of the EU by Council Decision (EU) 2018/219[110]. The EU and the Swiss Confederation exchanged the instruments of ratification on 6 December 2019, after the Swiss Confederation extended its ETS to aviation via Decision 2/2019 on 5 December 2019[111]. Consequently, the Linking Agreement

[108] Council Decision (EU) 2017/2240 of 10 November 2017 on the signing on behalf of the Union, and provisional application of the 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, p. 1

[109] 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, p. 3

[110] Council Decision (EU) 2018/219 of 23 January 2018 on the conclusion of the Agreement between the European Union and the Swiss Confederation on the linking of their greenhouse gas emissions trading systems, OJ L 43, 16.2.2018, p. 1

[111] Decision No 2/2019 of the Joint Committee established by the Agreement between the European Union and the Swiss Confederation on the linking of their greenhouse gas emissions trading systems of 5 December 2019 amending Annexes I and II to the Agreement between the European Union and the Swiss Confederation on the linking of their greenhouse gas emissions trading systems, OJ L 314, 29.9.2020, p. 68

entered into force on 1 January 2020[112]. Since then, emissions in 2020 in the EU ETS and the Swiss ETS are covered by the linked systems.

The Linking Agreement does not affect the independent character of the EU and the Swiss ETS. Both systems remain independent, unlike the systems of Iceland, Liechtenstein and Norway, which are fully integrated into the EU ETS by means of the mechanisms laid down in the EEA Agreement. The Linking Agreement defines the conditions and requirements under which the two systems are linked and establishes the mechanism needed to ensure that the linking conditions of Article 25 of the EU ETS Directive[113] are met.

Including aviation in the Linking Agreement was a crucial requirement for the EU. Based on Article 6 of the Agreement, Switzerland applies the same approach to coverage, cap and allocation of allowances as the EU ETS. Swiss domestic flights and flights from Switzerland to the EEA are covered by the Swiss ETS, while flights from the EEA to Switzerland fall under the EU ETS. This enables the Linking Agreement to contribute to the environmental integrity of both the EU ETS and the ETS of Switzerland.

As shown in Table 7, compatibility of the two systems is not a matter of size, but a matter of qualitative requirements and considerations to safeguard the integrity of the linked carbon markets and the level playing field for operators.

Table 7. Comparison of the EU ETS and the Swiss ETS

<table>
<tr><th></th><th colspan="2">EU ETS</th><th colspan="2">Swiss ETS</th></tr>
<tr><td>Number of general allowances auctioned in 2020</td><td colspan="2">778 505 000</td><td colspan="2">265 000 (out of which 175 000 auctioned in 2021 due to cancellation of auctions in 2020)</td></tr>
<tr><td>Number of aviation allowances auctioned in 2020</td><td colspan="2">9 174 000</td><td colspan="2">196 500</td></tr>
<tr><td>Number of general allowances allocated for free in 2020</td><td colspan="2">66 775 8544</td><td colspan="2">4 391 331</td></tr>
<tr><td rowspan="2">Number of aviation allowances allocated for free in 2020 to operators</td><td>EU aviation allowances for EU ETS</td><td>Swiss aviation allowances for Swiss ETS</td><td>Swiss aviation allowances for Swiss ETS</td><td>EU aviation allowances for EU ETS</td></tr>
<tr><td>32 486 017</td><td>501 278</td><td>570 696</td><td>473 521</td></tr>
<tr><td>Verified emissions of stationary installations in 2020</td><td colspan="2">1 355 141 953</td><td colspan="2">4 874 278</td></tr>
<tr><td rowspan="2">Verified emissions of aviation operators in 2020[114]</td><td>EU ETS</td><td>Swiss ETS</td><td>Swiss ETS</td><td>EU ETS</td></tr>
<tr><td>24 917 481</td><td>299 610</td><td>283 329</td><td>366 102</td></tr>
<tr><td>Number of stationary installations in 2020</td><td colspan="2">10 437[115]</td><td colspan="2">51</td></tr>
</table>

[112] Notice concerning the entry into force of the Agreement between the European Union and the Swiss Confederation on the linking of their greenhouse gas emissions trading systems, OJ L 330,20.12.2019, p. 1

[113] In accordance with Article 25 of the EU ETS Directive, the EU ETS can be linked to 'compatible mandatory greenhouse gas emissions trading systems with absolute emissions caps'.

[114] Some aviation operators face compliance obligations under both systems.

[115] Operators not excluded in 2020 based on the EU Registry; the number of operators which reported emissions is 10 317.

Number of aviation operators in 2020	352[116]	3

Source: EUTL and the Swiss Registry[117]

As from the entry into force of the Linking Agreement, emissions generated under either system can be covered by surrendering allowances issued in either system. Therefore, operators of both systems can access a larger market, which may unlock efficiency gains. To make this happen, a direct link, as required by Article 3(2) of the Agreement, was made between the registries of both systems to transfer allowances from an account in one system to an account in the other system.

Following the entry into force of the Linking Agreement in 2020, operators (both stationary and aviation) used 642 413 allowances issued under the Swiss ETS[118], exercising the increased flexibility offered by the link between the EU and the Swiss ETS.

Tables 8 and 9 below show the effect of linking or the extent to which operators administered by either the EU ETS (Table 8) or the Swiss ETS (Table 9) benefitted from the link by using allowances issued in the other system to meet their surrendering obligations.

In the EU ETS, stationary installations used Swiss ETS allowances for compliance only to a very small extent, 0.0044% of obligations met using less than 60 000 Swiss general allowances. Aircraft operators covered by the EU ETS met 2.34% of obligations using Swiss aviation allowances but no general allowances.

Table 8. Units used for compliance in the EU ETS

EU ETS							
Stationary installations	**Free allocation and auctioning**	**Verified emissions**	**Surrendered units**				
			Total	**EUA**	**CHU 2020**		
	1.446.263.544	1.355.141.953	1.348.077.920	1.348.018.396	59.524		
% of total			100%	99,9956%	0,0044%		
Aviaton operators	**Free allocation (incl Swiss ETS) and auctioning**	**Verified emissions incl under CH ETS**	**Surrendered units**				
			Total	**EUAA**	**EUA**	**CHUA 2020**	**CHU 2020**
	42.177.108	25.217.091	24.880.715	12.292.505	12.005.321	582.889	0
% of total			100%	49,41%	48,25%	2,34%	0,00%

In the Swiss ETS, stationary installations met 0.19% of their obligations using EU ETS allowances. In contrast, EU ETS general and aviation allowances accounted for more than 40% of compliance of the aircraft operators covered by the Swiss ETS. This was due to the allocation of allowances from the EU received by some operators in the Swiss ETS to cover their emissions under the EU ETS.

[116] Operators not excluded in 2020 based on the EU Registry; the number of operators which reported emissions is 320.
[117] Swiss ETS Registry
[118] The figure includes direct allocation.

Table 9. Units used for compliance in the Swiss ETS

ETS of Switzerland								
Stationary installations	**Free allocation and auctioning (CHU)**	**Verified emissions**	**Surrendered units**					
			Total	**EUA**	**CHU 2020**	**CER**		
	4.656.331	4.874.278	4.877.617	9.390	4.761.361	106.866		
% of total			100%	0,19%	97,62%	2,19%		
Aviation operators (administered by Switzerland)	**Free allocation (incl EU ETS) and auctioning**	**Verified emissions incl under EU ETS**	**Surrendered units**					
			Total	**EUAA**	**EUA**	**CHUA**	**CHU**	**CER**
	1.240.717	649.431	649.971	263.375	540	373.640	0	12.416
% of total			100%	40,52%	0,08%	57,49%	0,00%	1,91%

Table 10. Transfers of allowances between the EU and the Swiss ETS, September 2020 – April 2021

Transfers (general and aviation allowances from both systems)		
From	*To*	*Total number*
EU	CH	977.065
CH	EU	450.578
Balance		**526.487**

8. EFFECTS OF IMPLEMENTING THE ENERGY EFFICIENCY DIRECTIVE AND THE NATIONAL ENERGY AND CLIMATE PLANS ON THE EU ETS

The carbon market report should take into consideration the effects of implementing the Energy Efficiency Directive and the overall impact of the policies and measures included in the integrated national energy and climate plans (NECPs), on the operation of the EU ETS, including the supply-demand balance of allowances on the EU carbon market[119]. This chapter covers these two topics.

8.1 Impact of the Energy Efficiency Directive implementation on the EU ETS

There are several interactions between the EU ETS and the Energy Efficiency Directive, in particular where policy measures have an impact on the energy efficiency of operators subject to the system. Article 8 of the Energy Efficiency Directive promotes cost-effective energy efficiency measures by requiring large operators to conduct an energy audit every four years or to use a certified energy or an environmental management system. This helps large

[119] Based on Article 24 of the Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency (OJ L 328, 21.12.2018, p. 210), and on Articles 29 and 35 of the Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action (OJ L 328, 21.12.2018, p. 1).

operators identify energy losses, the energy savings' potential and cost-effective measures to reduce their energy consumption.

A central provision of the Energy Efficiency Directive aimed directly at producing energy savings is Article 7, which requires Member States to take policy measures to achieve energy savings[120]. Since Member States have a choice as to which sectors to focus on, these measures might interact with obligations under the EU ETS. As concerns potential impacts on EU ETS sectors, Member State measures can be classified into four categories:

- Energy efficiency policy measures implemented in sectors outside of the scope of the EU ETS that have no direct interactions with the system, such as replacing an old coal stove with a more efficient biomass-fired boiler.
- Energy efficiency measures targeting a reduced consumption of energy supplied from ETS sectors, such as electricity, district heating and refineries providing fuel for transport and heating. These include insulating buildings supplied by district heating, replacing electric appliances and transport fuel efficiency measures. While the relevant decisions lie outside of installations covered by the EU ETS, the carbon price signal may incentivise action by market actors, predominantly consumers.
- Policy measures promoting actions leading to a change of energy carrier, such as replacing an electric heater with a solar heater (leading to reduced energy consumption in an ETS sector) or replacing of a gas boiler with a heat pump (leading to increased energy consumption in an ETS sector).
- Policy measures promoting energy efficiency of the core processes of installations subject to the EU ETS.

The latter measures interact directly with the EU ETS. In the 2014-20 period, Belgium, the Netherlands and Romania[121] reported Article 7 policy measures focused on ETS installations - voluntary agreements (in the case of Belgium and the Netherlands) or equivalent (for Romania)[122]. These measures accounted for a high share of the cumulative energy savings reported by these countries for 2014-2018: 61% for Belgium, 20% for the Netherlands and 44% for Romania[123]. While the voluntary agreements stipulate that operators should commit to energy efficiency or energy savings targets, these targets are not limited to the energy consumption subject to the EU ETS. In practice, most energy savings are likely to come from energy efficiency improvements in the industrial processes falling under the EU ETS, but part of the savings may come from the energy consumption outside of the system (e.g. fuel

[120] Commission Recommendation on the transposition of the energy savings obligation, C(2019) 6621 final

[121] Member States had an obligation to report annually until 30 April 2020. The final report covering the whole obligation period is due by March 2022. These are the three Member States that have designed a measure to specifically address the industries in the EU ETS. There are significantly more measures targeting industries in general (those could cover industries in the scope of EU ETS and outside). The ODYSSEE-MURE database on energy efficiency measures in EU lists more than 200 measures addressed to industries in Member States.

[122] Voluntary agreements and equivalent measures are both alternative measures in the meaning of Article 7(b) of the Energy Efficiency Directive. The original iteration of the Directive, adopted in 2012, had included a non-exhaustive list of alternative measures but after its revision in 2018 the list was removed.)

[123] These numbers originate from annual reports submitted by Member States in line with Article 24(1) of the Energy Efficiency Directive. The shares are expressed in relation to Article 7 cumulative savings reported for years 2014-18.

efficiency in transport, energy efficiency in offices). Although most Member States include at least one policy measure targeting industries also covered by the EU ETS in their action scope, the Article 7 reported data do not distinguish between the share of savings from ETS industries and savings from other (sub-)sectors.

For the period 2014 – June 2020, provisions of Article 7(4) of the Energy Efficiency Directive addressed interactions with the EU ETS.

- Article 7(4)(b) referred to an option that Member States could use when calculating the required amount of energy savings for the period 2014-20. They could exclude from the calculation all or part of the sales of energy used in industrial sites covered by the EU ETS. The option was used by 15 Member States.[124]

- Article 7(4)(c) made it possible for Member States to report energy savings from measures promoting energy efficiency on the supply side towards the amount of energy savings calculated in accordance with Article 7(2) and (3). This option has only been used by three Member States[125].

Energy savings from energy efficiency policy measures in the ETS reduce the demand for allowances. The impact on GHG emissions is more complex, since the ETS caps the aggregate emissions of all covered entities, and the MSR takes care of supply-demand imbalances. Energy savings in the sectors directly included in or indirectly linked with the ETS may hence contribute to reducing emissions or to lowering of carbon prices. Also, to the extent that energy efficiency policy measures tackle market failures and barriers to the uptake of cost-effective energy-saving measures, and have additional benefits, they also enable participants to reduce emissions at lower costs. In turn, the carbon price incentive of the EU ETS contributes to achieving the EU targets and the indicative national energy efficiency targets under Article 3.

8.2 Impact of national energy and climate plans' implementation on the EU ETS

27 national energy and climate plans (NECPs) finalised in 2019 give an overview of how EU Member States approach the first phase of their transition towards climate neutrality from 2021 to 2030.

The Commission's assessment of the NECPs[126] showed that under existing and planned measures, Member States plan to reduce emissions by 41% below 1990 levels, surpassing the EU's previous 2030 reduction target of 40%. The plans also indicate that almost all Member

[124] This option cannot be used for 2021-30, as for this obligation period, the options in Article 7(4) of the Energy Efficiency Directive do not reduce the minimum amount of cumulative savings required, cf. Article 7(5) of the Directive.
[125] Denmark (energy savings related to district heating as part of the EEOS), Romania (set of 5 measures dealing with efficiency in power plants, high-efficiency cogeneration, efficiency in transmission and distribution networks and efficiency in district heating) and Slovenia (3 measures related to efficiency in district heating).
[126] The assessment of the cumulative impact of the NECPs (COM(2020) 564 final), is available here: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0564&from=EN
The Commission's individual assessments of each NECP can be found here: https://ec.europa.eu/energy/topics/energy-strategy/national-energy-climate-plans/individual-assessments_en

States that use coal to generate electricity are phasing it out or have set phase-out dates. A total of 21 Member States are either already coal-free in terms of electricity production[127], or have committed to phasing-out coal (including lignite and peat), indicating specific dates in their NECPs. In this context, the NECPs project the use of coal to decrease by 70% by 2030 compared to 2015, with renewable electricity set to reach 60% of electricity produced by 2030. These developments would directly affect the EU ETS, potentially leading to a substantial decrease in emissions from the power sector, and a subsequent fall in demand for emission allowances. To the extent these policy-driven phase-outs accelerate carbon-market driven coal phase-outs and those impacts are not neutralised by the Market Stability Reserve, they could lower carbon prices in the ETS.

The Commission's assessment also showed that the share of renewable energy at EU level under existing and planned measures could reach 33.1-33.7% by 2030, exceeding the 2030 target of at least 32%. Further investments and reforms in renewable energy identified in NECPs have the potential to push this share higher still. With regard to energy efficiency, more ambition is needed to reach the 2030 target.[128] Although the final plans and measures planned at EU level show a heightened awareness of the issue, there are still significant efforts to be made to close the gap. In as much as these developments would affect the sectors directly included in or indirectly linked with the EU ETS, they may drive down demand for allowances. In turn, the carbon price incentive of the EU ETS contributes to achieving the national renewable energy and energy efficiency targets set in the NECPs.

Since the Commission's assessment of the final NECPs in October 2020, some Member States have made changes and adaptations to their plans. More detailed information on the implications thereof is available in the EU Climate Action Progress Report 2021[129]. All Member States are due to submit updates of their NECPs in June 2023 (in draft form) and 2024 (final plans). These should reflect the increased ambition in line with the EU target to reduce net GHG emissions by 2030 by at least 55% relative to 1990, including potentially taking into account the higher 2030 energy efficiency (savings of 36-39% of final and primary energy consumption) and renewable energy (40% share of renewables in the EU's energy mix) targets proposed by the Commission with the legislative package on deliver on the European Green Deal. The Commission will assess all updated draft plans by the end of 2023 and the final plans by the end of 2024.

9. CONCLUSIONS AND OUTLOOK

In phase 3 of the EU ETS (2013-20), GHG emissions from electricity production and industrial installations covered by the system fell by almost 29%[130], contributing to the overall decrease of around 43% since the system was set up in 2005. Although the significant decrease of emissions by 11.4% in 2020 undoubtedly can be attributed to a large extent to the

[127] Belgium, Cyprus, Estonia, Latvia, Lithuania, Luxembourg and Malta
[128] The gap stands at 2.8 percentage points for primary energy consumption and 3.1 percentage points for final energy consumption, compared to the target to increase energy efficiency by at least 32.5% by 2030.
[129] Climate Action Progress Report 2021, COM(2021)951 final
[130] Between 2013 and 2020

effects of the COVID-19 pandemic, it marked another year in an almost uninterrupted trend of emissions falling year-on-year in phase 3. This reflects the decarbonisation trends identified mainly in electricity and heat production. Confirming this trend, pre-pandemic 2019 emissions fell by more than 9% compared to 2018.

In aviation, ETS-covered GHG emissions rose by 27.5% between 2013 and 2019, increasing every year until 2020, when the trend was reversed by the pandemic and verified emissions fell sharply by 63% compared to 2019. This meant that 2019 was the year with the highest aviation emissions to date.

The legislative changes agreed in phase 3 to reinforce the EU ETS and address the surplus of allowances yielded positive results. From 2018 to 2019, when the Market Stability Reserve began operating, the surplus fell significantly from 1.65 billion to around 1.39 billion allowances. Although in 2020 the surplus increased due to lower demand, the additional surplus is expected to be absorbed over the next two to four years, thus contributing to the proper functioning of the market. Moreover, on the basis of the published surplus indicator and the EU ETS legislation for phase 4 (2021-30), auction volumes in 2021 were reduced by nearly 40% and volumes in 2022 will be reduced in a similar manner.

The end of phase 3, after the Market Stability Reserve had become operational, was marked by an increase in confidence of market participants, reflected in a stronger carbon price signal. In 2020 and 2021 when, despite the difficult economic situation for industry and aviation due to the COVID-19 crisis, the carbon price signal remained stable in 2020 and rose considerably in 2021, influenced by high gas prices and market anticipation of the implications of the increased 2030 climate ambition.

The higher price of emission allowances led to a substantial increase in total revenues from auctioning generated by the EU ETS participating countries. Between 2012 and 30 June 2021, these revenues exceeded EUR 83.5 billion, with more than EUR 19 billion generated in 2020 and close to EUR 14 billion in the first half of 2021.[131] In phase 3 overall, a high share (75%) of these revenues was used for climate– and energy-related purposes.

Throughout phase 3, and despite the difficult economic situation due to the COVID-19 crisis in the 2020 and 2021 compliance cycles, the level of compliance in the EU ETS remained consistently very high. Operators responsible for over 99% of emissions from both stationary installations and aviation in most years, had complied with their legal obligations. The EU ETS architecture remained robust and the administrative organisation put in place across participating countries has proven to be effective.

The first agreement to link arethe EU ETS with another system – the Swiss ETS, in the last year of phase 3, fosters increased flexibility and efficiency in both carbon markets, by enabling operators of both systems to reap the benefits of a larger market.

[131] The 2020 figure includes EU27, Iceland, Liechtenstein and Norway, and the UK, while the 2021 figure includes EU27 plus Iceland, Liechtenstein and Norway only.

For the following years, as part of the package to deliver on the European Green Deal adopted in July 2021, the Commission proposed to reinforce and expand the role of carbon pricing to enable the EU to meet its heightened climate ambitions. The EU ETS remains a key pillar of EU climate policy. The next carbon market report, due for publication in late 2022, will provide an overview of the operation of the EU ETS in the first year of phase 4.