22 October 2025
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ESMA Market Report

EU carbon markets 2025

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 The reporting period of this report is 1 January 2024 to 31 December 2024, unless indicated otherwise. Legal reference of this report: Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union and Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading system 'ESMA shall regularly monitor the integrity and transparency of the European carbon market, in particular with regard to market volatility and price evolution, the operation of the auctions, trading operations on the market for emission allowances and derivatives thereof, including over-the-counter trading, liquidity and the volumes traded, and the categories and trading behaviour of market participants, including positions of financial intermediaries. ESMA shall include the relevant findings and, where necessary, make recommendations in its assessments to the European Parliament, to the Council, to the Commission and to the European Systemic Risk Board in accordance with Article 32(3) of Regulation (EU) No 1095/2010 of the European Parliament and of the Council. For the purposes of the tasks referred to in the first sentence of this paragraph, ESMA and the relevant competent authorities shall cooperate and exchange detailed information on all types of transactions in accordance with Article 25 of Regulation (EU) No 596/2014 of the European Parliament and of the Council'.

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Table of Contents

Executive Summary

This report marks the second edition of ESMA's annual report on carbon markets under its EU Emissions Trading System (ETS) Directive monitoring mandate. The first report established a comprehensive monitoring framework mainly based on financial regulatory data reported to EU and national authorities. This new report builds on these foundations to explore a topic of particular interest for the functioning of the EU ETS – namely the trading strategies of non-financial counterparties.

Turning to ETS market developments in 2024, the analysis shows a continuation of several trends already observed in ESMA's previous report. The annual average price of EU emission allowances (EUAs) continued to decline and was down 22% overall in 2024, driven by weak demand from continued power sector decarbonisation and higher EUA auction volumes. EUA prices stabilised after the first quarter of 2024, displaying elevated correlation levels with natural gas prices.

In 2024, there were 599mn allowances (+15% from 2023) auctioned on the Common Platform, amounting to EUR 39bn (-11%) due to the lower prices throughout the year. All auctions were oversubscribed although the cover ratio was down 30pps from 2023, at 172%. Volumes remained significantly concentrated across only a few market participants, with almost 90% of EUAs acquired by just 10 bidders.

Trading activity increased by 35% in 2024, reaching a total of 13.7 bn tonnes of CO2-equivalent emissions (tCO2) exchanged across 4.7mn transactions. Market growth was primarily driven by on-venue trading, while OTC trading activity remained stable. Investment firms and credit institutions dominated both on- and off-exchange markets, accounting for 63% of total trading volumes – a 7 percentage-point increase from 2023 (see Annexes for an explanation of counterparty classification).

Derivative markets continued to play a key function in the EU ETS by facilitating the acquisition of EUAs by compliance entities holding net long positions from financial intermediaries holding net short positions. Central to this are futures contracts, which accounted for three-quarters of volumes traded in 2024. Meanwhile, options' share saw a modest increase of approximately 4 percentage points. Throughout the year, there were on average 909 daily derivative position holders, up from 783 in 2023. This included 453 investment funds holding just 6% of all positions, while investment firms and credit institutions held 51% of all positions (up 10 percentage points from 2023).

Overall, in response to its mandate under the EU ETS Directive Art.10(6), ESMA has not identified any significant issue in the integrity or transparency of EU carbon markets. EUA auctions and trading dynamics remain largely unchanged, with the market organised in a way that facilitates the flow of EUAs from financial intermediaries to non-financial firms with compliance obligations. Our analysis of EUA trading and positions within the non-financial sector further highlights that the ETS market accommodates different acquisition strategies, reflecting the different needs and capabilities of participants (see p.18).

The absence of standardised identifiers for ETS account holders remains a key challenge. The ability to identify and classify ETS participants across the different datasets (see Annex) remains core to ESMA's mandate. Accordingly, ESMA reiterates its recommendation to enhance the adoption of Legal Entity Identifiers (LEIs) within the Union Registry, which would facilitate future EU ETS monitoring.

Essential statistics

Prices and volatility

	2024	2023
Spot price (EUR/tCO2)	65	83
5Y forward price (EUR/tCO2)	79	101
Volatility (%)		
Historical	2.2	1.9
Intraday	1.1	1.0
Total Number of Allowances in Circulation (MtCO2e)	1,148	1,112
Verified GHG emissions (MtCO2e)	1,018	1,150

Primary markets – Auctions

	2024	2023
Number of auctions held	221	223
Number of EUAs auctioned (MtCO2e)	599	523
Volumes of EUAs auctioned (EUR bn)	38.8	43.6
Number of participants	44	44
Non-financials	30	30
Financials	14	14
Coverage ratio (%)	172	202

Secondary markets – Trading

	tCO2[1] billion		EUR billion	
Trading volumes	2024	2023	2024	2023
On exchange	12.6	9.1	644	623
Futures	9.7	7.3	642	621
Options	2.9	1.8	1.2	0.9
Other contracts (including spot)	0.02	0.03	0.8	1.1
Off exchange	1.1	1.0	69	80
Share of volumes traded (%)				
Compliance entities and other non-financials	21	31	22	26
Investment firms and credit institutions	64	57	67	64
Investment funds	15	11	10	9
Rest[2]	0.5	1	1	1

Positions in EUA derivatives

	2024	2023
Average daily number of position holders	909	783
Compliance entities and other non-financials	259	205
Credit institutions and investment firms	122	118
Investment funds	453	406
Rest[2]	74	55
Average daily net long positions (thousands)[3]		
Compliance entities and other non-financials	315	+359
Credit institutions and investment firms	-326	-362
Investment funds	-14	-2
Rest[2]	+4	+3

Note: [1]tCO2= Tonnes of CO2-equivalent emissions. [2]Rest= Other financials and unclassified entities (e.g. due to the absence of identifiers). [3]Positions are in lots (1,000 allowances).
Sources: ICE Endex, European Energy Exchange, Nasdaq Oslo, LSEG Eikon, Union Registry, ESMA.

Prices and volatility

Summary

The annual average price of EUAs decreased 22% in 2024, reaching a low of EUR 51/tCO2 in February before recovering somewhat. Price developments were driven by weak demand for EUAs from continued power sector decarbonisation, and higher auctioned volumes, leading to a slight increase in the total number of allowances in circulation. EUA prices displayed elevated correlation with natural gas prices, which came down from their 2022 peaks.

Lower prices from weak demand and higher supply

In 2024, the **spot price of EUAs** averaged EUR 65 per tonne of CO2-equivalent emissions (/tCO2), down 22% from 2023. After reaching a low of EUR 51/tCO2 at the end of February 2024, spot prices recovered and fluctuated between EUR 60 and EUR 75/tCO2 for the remainder of the year (CMR.3).

This marked the first year-on-year decline in EUA prices since 2020, when industrial production collapsed during the pandemic, leading to a sharp reduction in greenhouse gas (GHG) emissions and a corresponding decrease in the demand for allowances.

A key driver behind this remained weak EUA demand, with GHG emissions of companies within the ETS scope down 5% in one year. Emissions from electricity production decreased by 12% as production from renewable energy sources increased by 8%.[1] ETS sectors are on track to meet the 62% reduction in GHG emissions by 2030.[2]

Meanwhile, EUA auction volumes increased in 2024 to help finance the EU's renewable energy acceleration program (REPowerEU). There were 525mn EUAs allocated for free (-6% from 2023) and 599mn EUAs auctioned (+15%), leading to a 3.3% increase in the **total number of allowances in circulation** (CMR.2).

The EUA **forward curve** shifted down for a second consecutive year as futures prices declined in line with the spot price (CMR.4) while the EUA futures' cost of carry was broadly unchanged (CMR.5). **Historic** and **intraday volatility** remained generally low, despite a slight increase at the beginning of 2024 (CMR.6 and CMR.7).

High correlation with natural gas

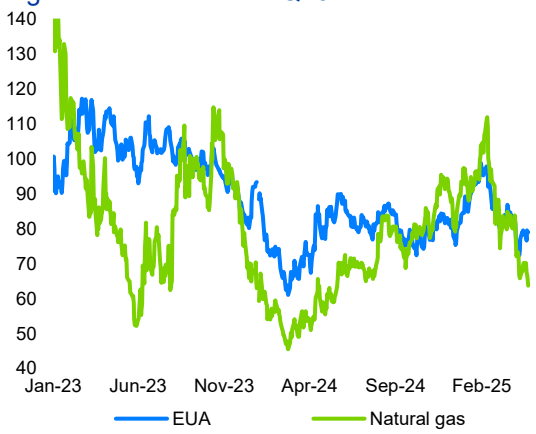
Natural gas appears to have been a key driver of EUA prices through part of the year. When natural gas prices increase, energy producers switch to more polluting energy sources such as coal, leading to higher demand for EUAs.

As natural gas prices came down from their 2022 peaks, utilities switched back from coal to gas, leading the 50-day correlation between daily EUA and gas price returns to a peak of 89% in May 2024 (CMR.1). The correlation declined later that year as other factors came into play.

CMR.1

EUA vs. natural gas prices

High correlation since 4Q23



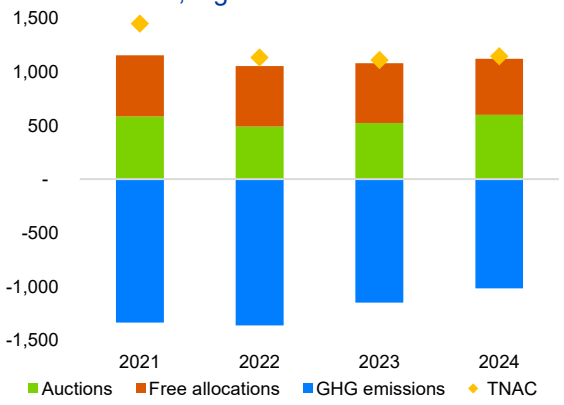
Note: Daily prices of EU emission allowances and Dutch TTF Natural gas, indexed with 01/09/2023=100.
Sources: Refinitiv Eikon, ESMA.

[1] See European Commission, *EU ETS has reduced emissions in the sectors covered by 50% since 2005*, 4 April 2025.

[2] See European Environment Agency, *Trends and projections in Europe 2024*, 31 October 2024.

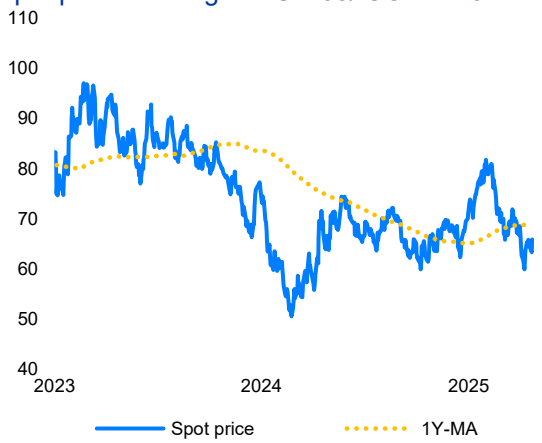
Key indicators

CMR.2
Supply and demand
Lower demand, higher auctioned volumes



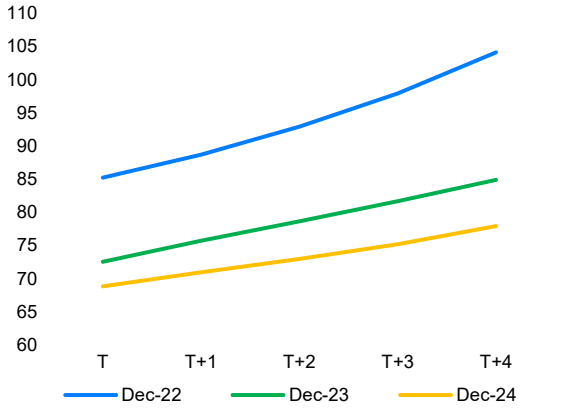
Note: Annual supply (free allocations and auctions) and demand (GHG emissions) of EUAs, in metric tonnes of CO2. TNAC=Total Number of Allowances in Circulation.
Sources: European Commission, ESMA.

CMR.3
Spot price
Spot prices averaged EUR 65/tCO2 in 2024



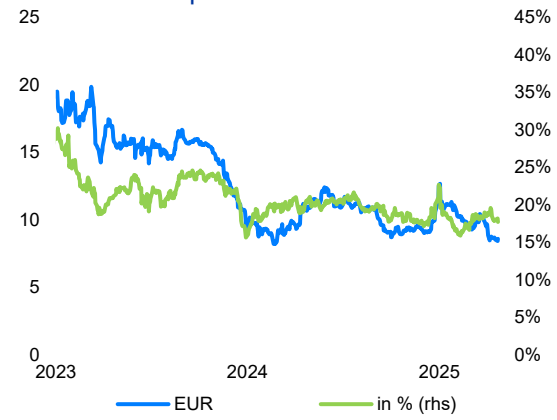
Note: Daily spot price of EU emission allowances, in EUR/tCO2. 1Y-MA=one-year moving average.
Sources: Refinitiv EIKON, ESMA.

CMR.4
Forward curve
Forward curve shifted down



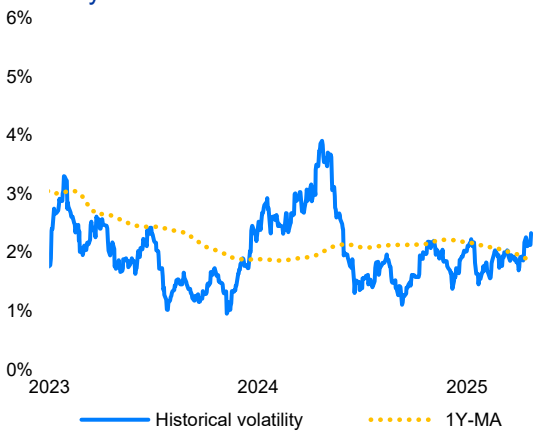
Note: Forward curve of December futures contracts on EU emission allowances traded on ICE Endex, in EUR/tCO2. T=Dec-25 expiry; T+1=Dec-26 expiry, etc.
Sources: Refinitiv EIKON, ESMA.

CMR.5
Cost of carry
Stable forward spread since end-2023



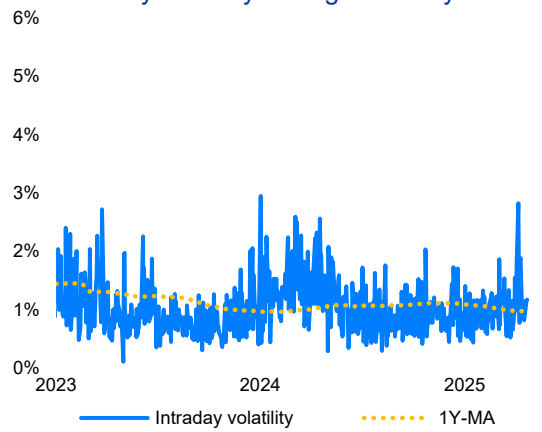
Note: Five-year forward spread of EU emission allowances, calculated as difference between front year and 5-year futures, in absolute (EUR/tCO2, left axis) and relative (%, right axis) term.
Sources: Refinitiv EIKON, ESMA.

CMR.6
Historical volatility
Volatility remained contained in 2024



Note: Historical volatility of EU emission allowance prices calculated as 20-day standard deviation of daily returns. 1Y-MA= one-year moving average.
Sources: Refinitiv EIKON, ESMA.

CMR.7
Intraday volatility
Low intraday volatility throughout the year



Note: Intraday volatility of EU emission allowance prices calculated following the Parkinson method. 1Y-MA= one-year moving average.
Sources: Refinitiv EIKON, ESMA.

Auctions

Summary

In 2024, 599mn emission allowances (+15%) were auctioned, amounting to EUR 39bn (-11%). All auctions were oversubscribed although the cover ratio was down 30 percentage points from 2023, at 172%. The number of auction participants slightly increased to 24 per auction. As in 2023, firms without direct compliance obligations were the main actors in the primary market and more than half of auctioned EUAs were bought by entities domiciled in Germany. Volumes remained significantly concentrated across only a few market participants, with 90% of EUAs acquired by only 10 firms.

Volumes increased for second year in a row

The frontloading of auction supply under the EU's REPowerEU programme, which began in the second half of 2023, continued to influence the primary market throughout 2024[3]. Over the year, a total of 599 million emission allowances were auctioned via the European Energy Exchange (EEX), generating revenues of approximately EUR 39bn[4]. This represented a 15% year-on-year increase in the **number of allowances** auctioned, despite an 11% decline in total auctioned value due to lower prices.

In total, 221 auctions were held in 2024 with an average monthly turnover of 50mn EUAs, equivalent to EUR 3.2bn. Auction volumes were the lowest in August and December, reflecting the seasonally reduced market activity during the summer and holiday periods (CMR.8).

Oversubscribed auctions, limited participation

Auctions in 2024 attracted an average of 24 **participants** per session, with 18 bidders successfully obtaining allowances (CMR.13). This marks an increase from 2023, which saw an average of 20 participants and 15 successful bidders. 34% of individual bids[5] were executed – 5 points lower than in 2023. All auctions were oversubscribed with an average cover ratio of 172%, 30pp less than in 2023 (CMR.9). These figures suggest a modest rise in participation but also point to a reduced tightness of the market and lower success rate of bids, influenced in part by the increased auction supply.

Around 80% of EUAs were purchased by entities without direct compliance obligations under the EU ETS[6], with a growing share of 49% allocated to financial sector firms (CMR.10). It is important to note that many of these firms are affiliated with or act on behalf of compliance entities. Low participation by compliance entities in auction markets is primarily due to limited internal expertise and the infrequent or small-scale nature of their EUA purchases[7].

More than half of the auctioned allowances in 2024 were acquired by entities domiciled in Germany (52%), followed by the United Kingdom (18%) and Spain (13%) (CMR.11).

Concentration remains high

The primary market remains **considerably concentrated** with only 44 active participants – compared with more than 10,000 installations facing compliance obligations.

As in 2023, just ten participants accounted for approximately 90% of all EUAs auctioned in 2024 (CMR.12). On average, three buyers secured 60% of allowances each auction – slightly down from 65% in 2023.

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3 Under the REPowerEU programme, additional auctioning proceeds of €20 billion are anticipated between 2023 and 2026, followed by an accelerated tightening of allowance supply starting in 2026.

4 Including 7mn EUAAs, equivalent to EUR 430mn.

5 An individual bid consists of a price and a quantity, and each auction participant can submit several bids.

6 Including investment firms, credit institutions and non-financial entities without any direct compliance obligation.

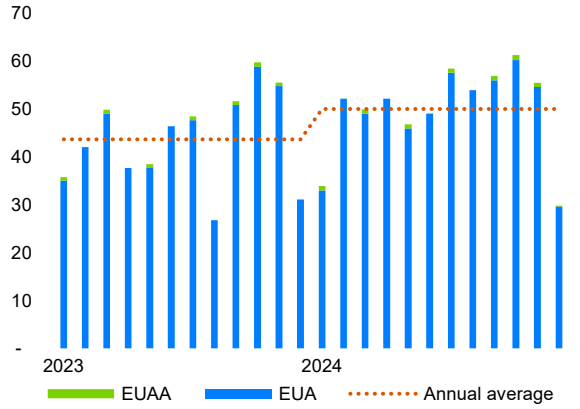
7 See Europe Economics, Participation in the EU ETS markets – A report for DG CLIMA.

Key indicators

CMR.8

Monthly auctioned volumes

50mn EUAs auctioned per month in 2024

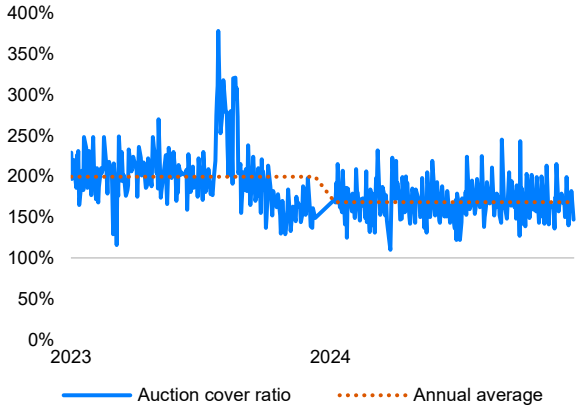


Note: Number of auctioned EU emission allowances (EUA) and EU aviation allowances (EUAA), in million.
Sources: BaFin, ESMA.

CMR.9

Auction cover ratio

All auctions were oversubscribed

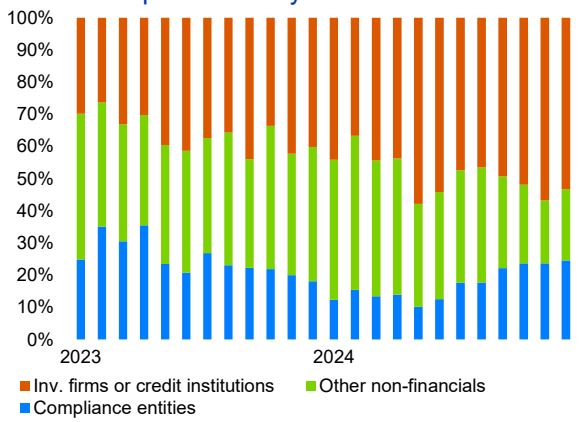


Note: Auction cover ratio for EU emission allowances.
Sources: EEX, ESMA.

CMR.10

Auction participants by sector

Most EUAs purchased by banks and inv. firms

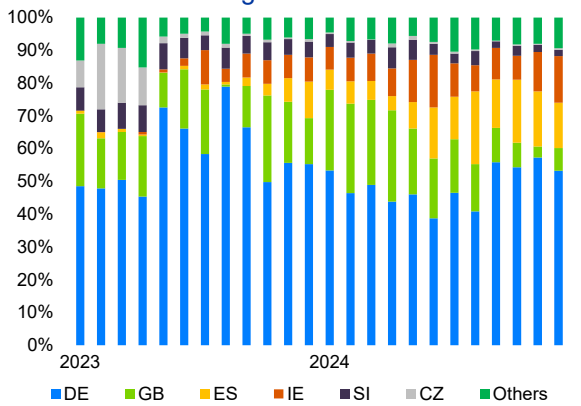


Note: Distribution of auctioned EU emission allowances by type of auction participants.
Sources: BaFin, ESMA.

CMR.11

Auction participants by domicile

German entities bought 53% of auctioned EUAs

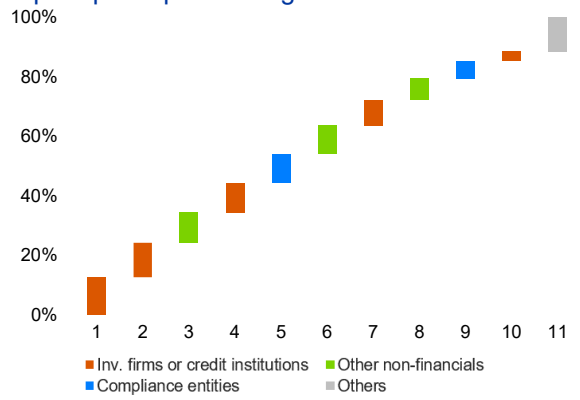


Note: Distribution of auctioned EU emission allowances by domicile of auction participants.
Sources: BaFin, ESMA.

CMR.12

Share of top 10 auction participants

Top 10 participants bought 89% of EUAs

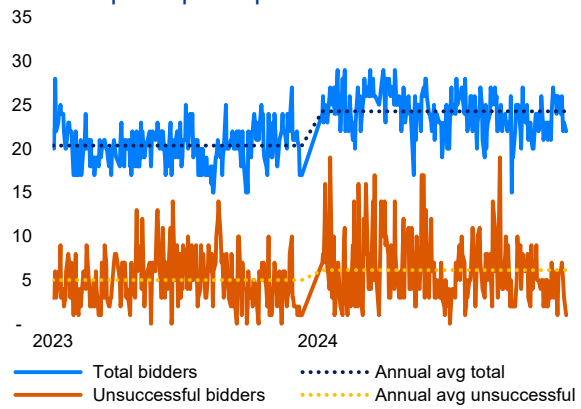


Note: Top-10 auction participants in 2024 by share of auctioned volume of EU emission allowances (EUA).
Sources: BaFin, ESMA.

CMR.13

Number of auction participants

20 to 25 participants per auction



Note: Total number of bidders and unsuccessful bidders in auctions of EU emission allowances and annual averages.
Sources: EEX, ESMA.

Secondary markets – Trading

Summary

Trading activity in EUAs increased by 35% in 2024, reaching a total of 13.7 bn tCO2 exchanged across 4.7mn transactions. Growth was primarily driven by on-venue trading, which accounted for 12.6bn tCO2 (EUR 644bn) across 4.2mn transactions. Over-the-counter (OTC) trading activity was stable at around 10% of total trading. However, lower EUA prices in 2024 led to a 13% decrease in the monetary value of OTC trading, totalling EUR 69bn. Investment firms and credit institutions dominated both the on- and off-exchange markets, accounting for 63.5% of total trading volumes, followed by other non-financials (17%) and investment funds (15%). Futures contracts accounted for 77% of on-exchange and 64% of off-exchange trading, highlighting their dominance in both markets. Among other derivative contracts, the share of options in on- and off-exchange saw modest increases of approximately 4pps and 6pps respectively in tCO2 terms. Volumes traded by non-EEA entities on-exchange increased by 3%, reaching a total figure of 72% (36% US and 25% UK), while the most active EEA entities were domiciled in DE (11%) and NL (7%).

Increased on-exchange activity driven by financials

Trading of EUA contracts on EU trading venues increased by 38% reaching almost 12.6bn tonnes of CO2-equivalent emissions (tCO2), worth EUR 644bn. These originated from 4.2mn transactions. [8] Although the number of on-exchange transactions increased by 45% compared to end-2023, monetary volumes increased just by 3%, due to lower EUA prices in 2024.

The **number of transactions** continued to increase in the first half of 2024, maintaining the upward trend observed at the end of 2023 (CMR.14). This corresponded to higher volatility in EUA and natural gas prices, which can be linked to geopolitical concerns including in the Middle East. The end of 2024 also saw another peak in trading activity, both in terms of volumes and number of transactions, possibly related to the expiration of the December futures contract.

The two main venues where trading occurred remained ICE Endex and the European Energy Exchange, which together account for 99% of the total number of transactions (CMR.22). **Futures** accounted for 77% of total trading volumes (9.7bn tCO2 or EUR 642bn; CMR.18).

On-exchange options trading increased to 2.9bn tCO2, up approximately 65% compared to 2023, reaching a total figure of EUR 1.2bn [9] across 12,100 transactions. Options can be used by EUA market participants to either hedge their positions against price fluctuations or speculate on EUA price movements.

The characteristics of these transactions reveal a concentration in options expiring in Dec-2024 and Jun-2024, with 1.1bn and 0.5bn tCO2 traded respectively. Average strike prices for options expiring earlier in the year were lower than those for contracts expiring end-2024, reflecting expectations of a rise in the underlying asset's value over time. Holders of call options expiring at year-end saw their contracts expire out of the money, with an average strike price around EUR 80/tCO2, compared to an average spot price of approximately EUR 67/tCO2.

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[8] On-exchange transactions and trading volumes refer, in this section, to the buy-side leg (since sell-side on exchange transactions mirror buy transactions and are reported separately). Hence, figures should be read as buy transactions and volumes bought. See Annex for the methodology.

[9] Monetary volumes (in EUR) are calculated by the multiplication of price, quantity and multiplier. The multiplier is expressed in number of lots included in a transaction (1,000 for future and option contracts and 1 for spot derivatives). In case of options, this approach might underestimate the total monetary value. The impact on the overall volumes remains yet limited.

The **financial sector** remained the main actor in EUA secondary markets, involved in 79% of trading volumes on exchange (9.9bn tCO2, or EUR 500bn), an increase of 10 percentage points from 2023. This includes 7.9bn tCO2 (EUR 426bn) traded by investment firms and credit institutions, and 2.0bn tCO2 (EUR 74bn) traded by investment funds (CMR.16). The main instruments traded by these entities were futures contracts, although options accounted for 45% of the volumes traded by investment funds.

The share of UK entities trading EUAs increased slightly (by 2 percentage points) to 25%, while the share of US entities remained stable at around 36%. The share of trading by entities domiciled in the EEA declined to 28%, this was mainly driven by a 3% decrease in trading by German entities.

Stable over-the-counter trading

Over-the-counter (OTC) trading in 2024 accounted for 8% of trading volumes in EUAs, a decrease of approximately 1pps compared to 2023. There were 1.1bn tCO2 (or EUR 69bn) exchanged across 520,000 OTC transactions. The number of transactions peaked during the first quarter, similar to on-exchange trading (CMR.19). The market also appears relatively concentrated by investor domicile, with the top five countries accounting for 68% (757 million tCO2) of total OTC volumes.

Trading in OTC mainly occurred though **futures**, which accounted for 64% (746mn tCO2) of overall OTC trading activity. **Options** trading accounted for 9% of the OTC EUA market volume in 2024 (103 million tonnes of tCO2), up from 3% in 2023.

Trading volumes showed an increase towards the end of the year, especially in spot and futures contracts (CMR.21). Futures contracts expiring in Dec-2024 and Dec-2025 were the most traded contracts, with investment firms and credit institutions the main participants. The majority of total trading occurred within investment firms or credit institutions, followed up by trading by investment funds and other non-financials. On OTC specifically, we observe increased activity between investment firms and non-financials, presumably related to the role of investment firms in answering their clients' ETS compliance needs.

Cyclical growth in open interest

Open interest in the ETS – measured as EEA30 counterparties' **gross notional positions** in EUA derivatives – increased from around EUR 77bn in January 2024 to EUR 142bn in January 2025. This increase was not linear, as open interest peaked in December at around EUR 200bn, before the most-traded EUA futures contract expired (CMR.23). Between January 2024 and January 2025, the share of open interest attributable to financial counterparties amounted to 63% on average, increasing from 57% in January 2024 to 71% in January 2025.

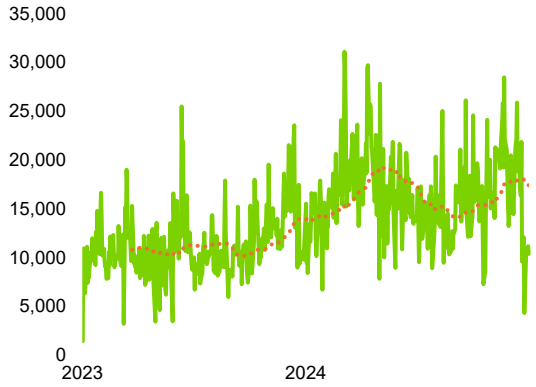
Futures remained the most prominent type of derivatives contract, in line with trading activity, amounting to 45% of open interest in 2024, followed by forwards at 30% and options at 19% (CMR.24). The share of open interest amounts in futures increased, from 32% on average in January 2024 to 56% in January 2025.

Key indicators

CMR.14

Daily number of transactions on-exchange

On-exchange transactions increased in 2024

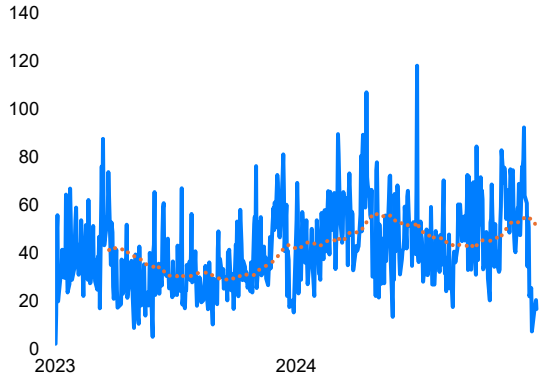


Note: Daily number of on-exchange buy transactions. 60-day moving average in orange.
Sources: MiFIR, ESMA.

CMR.15

Daily trading volumes on-exchange

Volumes traded rose by 38% in 2024

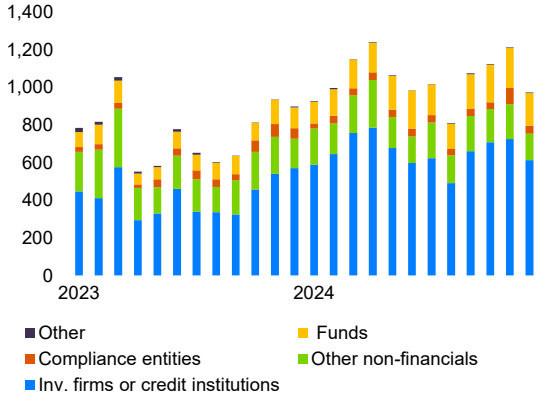


Note: On-exchange daily trading volumes in EUA derivatives, in millions of tonnes of CO2-equivalent emissions. 60-day moving average in orange.
Sources: MiFIR, ESMA.

CMR.16

On-exchange volumes by counterparty sector

Financial sector share increased by 10pps

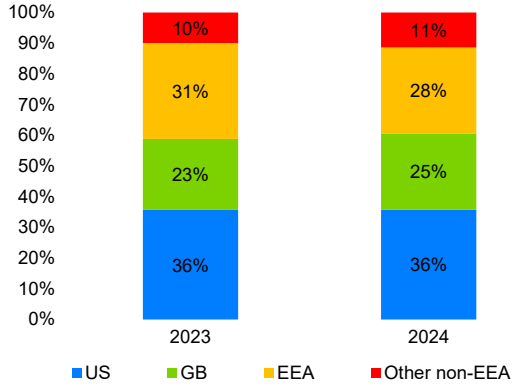


Note: Monthly trading volumes by counterparty country, in million of tonnes of CO2-equivalent emissions
Sources: MiFIR, ESMA.

CMR.17

On-exchange volumes by counterparty country

Lower share traded by EEA entities

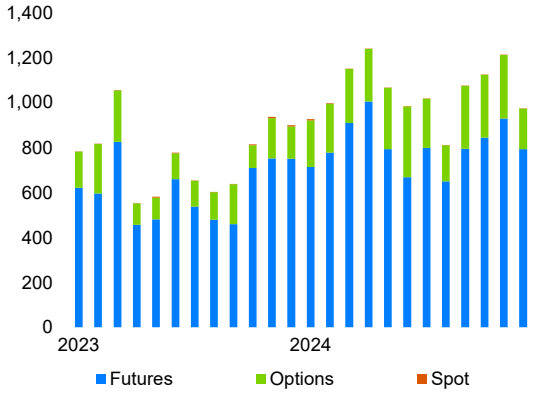


Note: Monthly trading volumes by counterparty domicile, in million of tonnes of CO2-equivalent emissions
Sources: MiFIR, ESMA.

CMR.18

On-exchange volumes by instrument type

Futures contracts still dominant

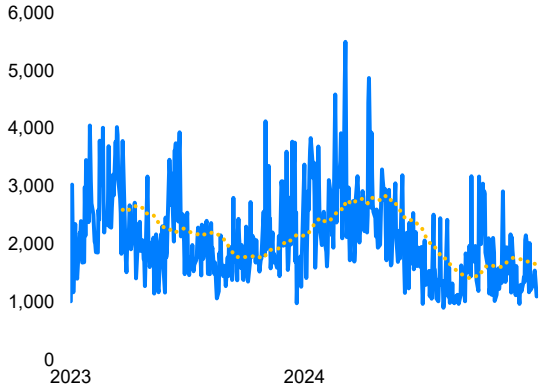


Note: Monthly trading volumes by instrument type, in million of tonnes of CO2-equivalent emissions
Sources: MiFIR, ESMA.

CMR.19

Daily number of transactions off-exchange

Off-exchange transactions peak 1Q24

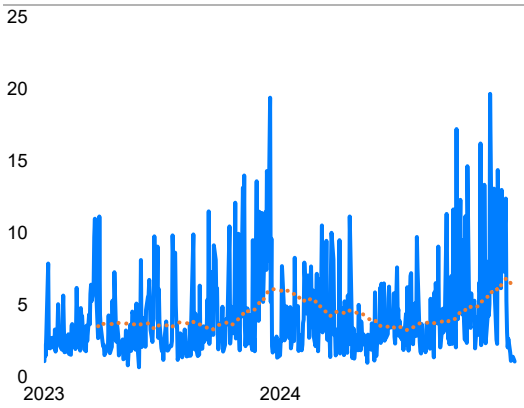


Note: Daily number of off-exchange buy transactions in EUA derivatives. 60-day moving average in orange.
Sources: MiFIR, ESMA.

CMR.20

Daily volumes of transactions off-exchange

Peaks in 4Q



Note: Daily off-exchange trading volumes in EUA derivatives, in million of tonnes of CO2-equivalent emissions. 60-day moving average in orange.
Sources: MiFIR, ESMA.

CMR.21

Off-exchange volumes by instrument type

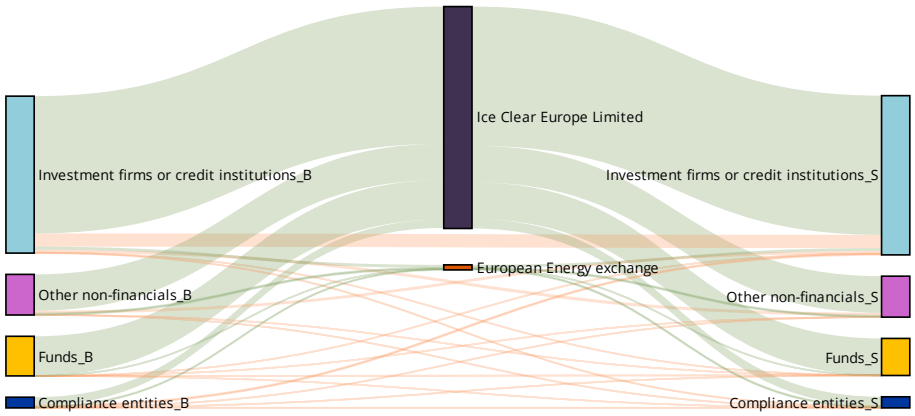
Increase in futures trading in 4Q

Note: Monthly off-exchange trading volumes by type of contracts, in million of tonnes of CO2-equivalent emissions.
Sources: MiFIR, ESMA.

CMR.22

Sankey chart

Main actors: Investment firms, credit institutions, other non-financial entities

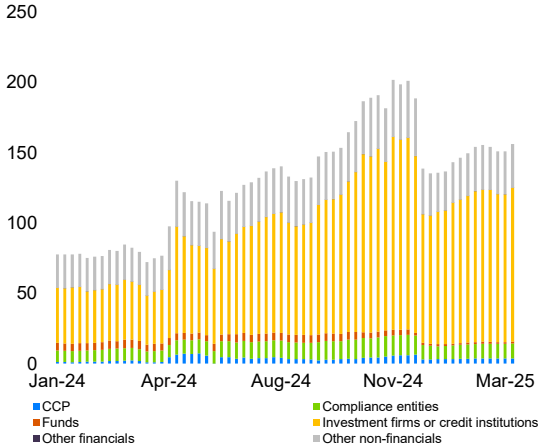


Note: Trading activity by counterparty sector on and off exchange. Flows are proportional to tonnes of CO2 equivalent emissions exchanged. Orange lines represent off-exchange trading, while green lines are for on-exchange. _B indicates that the counterparty is in the buy leg of the transaction. _S indicates that the counterparty is in the sell leg of the transaction.
Sources: MiFIR, ESMA

CMR.23

Total notional outstanding by sector

Open interest drops when Dec contract expires

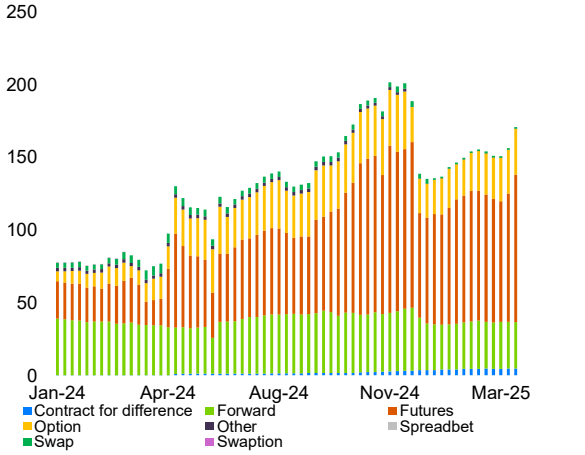


Note: Gross notional (EUR bn) in emission derivatives, by sector of the reporting counterparty. Intragroup trades excluded.
Sources: EMIR, ESMA

CMR.24

Total notional outstanding by contract type

Futures account for majority of open interest



Note: Gross outstanding notional in EU emission allowance derivatives by contract type, EUR bn. Intragroup trades excluded.
Sources: EMIR, ESMA

Positions in EUA derivatives

Summary

Derivatives markets play an important function in the EU ETS by facilitating the acquisition of EUAs by compliance entities from financial intermediaries. In 2024 there were on average 909 daily derivatives position holders, including 453 funds holding around 6% of all positions. Concentration in the December contract increased as the ETS compliance deadline shifted from April to September.

Derivatives position holders unchanged

Positions in EUA derivatives reflect the **annual compliance cycle** of the EU ETS. Compliance entities and other non-financials build long futures positions through the year in anticipation of the EUA surrender date the following year, with investment firms and banks acting as counterparties on the short side.

The number of **EUA derivative market participants** increased in 2024, with a daily average of 909 position holders (+16% from 2023). Investment funds continued to lead the pack with 453 position holders on average (+12%), followed by 259 compliance entities and other non-financials (+26%) and 122 investment firms and credit institutions (+0.3%; CMR.28).

A large majority of investment fund positions (73%) were held by managers domiciled in the Cayman Islands and Bermuda, while the US and UK accounted for 47% of positions held by investment firms and banks (down from 52% in 2023).

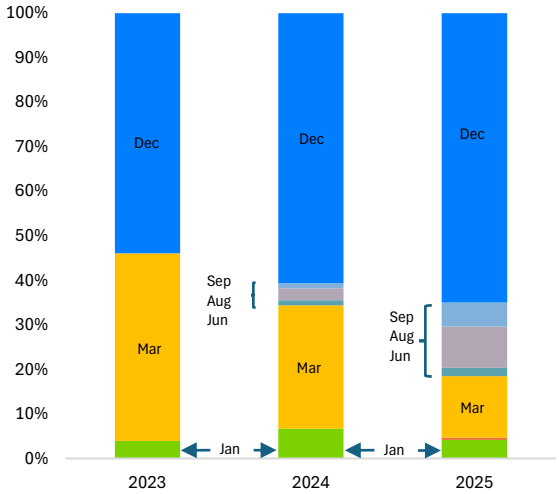
Position concentration increased

The number of **EUA derivative positions** peaked at 1.74 million in December 2024 (+4% from the 2023 peak, CMR.26). The shift away from the March expiry already highlighted in last year's report continued, with the EUA surrender deadline postponed from April to September. The Mar-25 contract accounted for 11% of positions in early 2025, down from 36% for the Mar-23 contract in early 2023 (CMR.25).

CMR.25

Share of derivatives positions by contract expiry month

Higher concentration in December contract



Note: Share of gross positions in EUA derivatives, by contract expiry date. Positions as of the first trading day of each year.
Sources: ICE Endex, EEX, Nasdaq Oslo, ESMA.

This shift mainly led to a higher concentration in the so-called 'next-Dec' expiry, the most liquid EUA futures contract. Indeed, the Dec-24 contract reached a maximum of 880,000 positions in October 2024. This compares with a peak of 660,000 positions in November 2023 for the Dec-23 contract (+33%). Furthermore, EUA positions started building up somewhat earlier during the year (CMR.27), and the total number of positions in the June, August and September contracts increased threefold between end-2023 and end-2024.

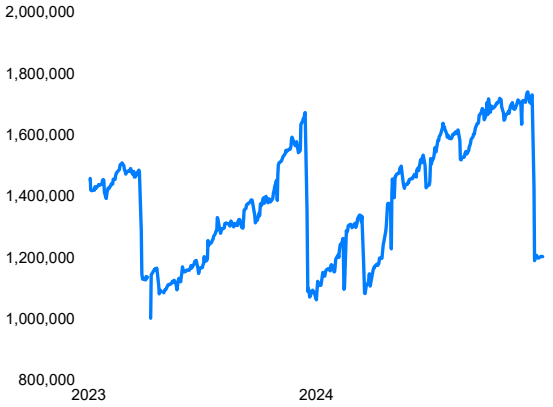
The share of positions held by investment firms and banks increased to 51% in 4Q24, up 10pp from a year earlier (CMR.29). Market positions remained largely in line with last year (CMR.30), with the exception of **investment funds** which tend to track EUA price developments and turned net long again in 2024, reflecting a more optimistic EUA price outlook (CMR.31).

Key indicators

CMR.26

Number of derivative positions

Positions built up earlier in 2024

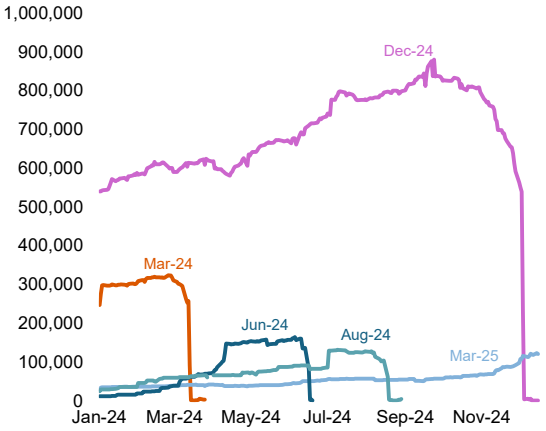


Note: Daily number of positions in EUA derivatives in lots (1,000 allowances).
Sources: ICE Endex, EEX, Nasdaq Oslo, ESMA.

CMR.27

Number of positions in most traded futures

March positions moved to June and August

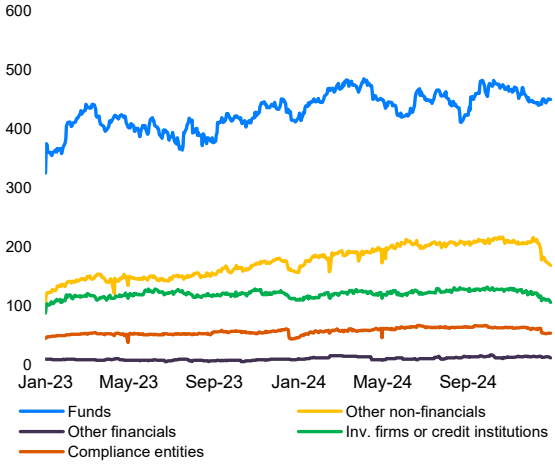


Note: Number of gross positions in EUA derivatives in lots (1,000 allowances), by contract expiry date.
Sources: ICE Endex, EEX, Nasdaq Oslo, ESMA.

CMR.28

Derivative position holders by sector

Number of non-financials and funds increased

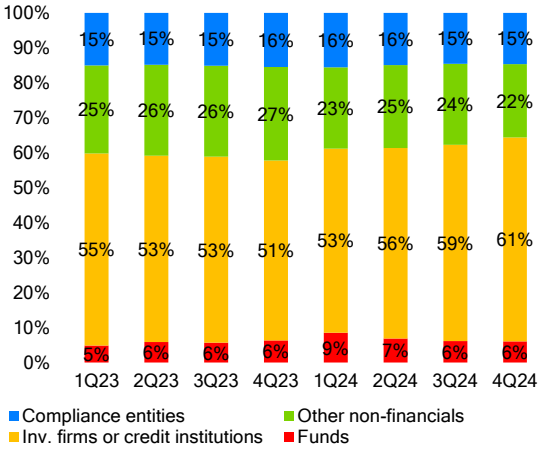


Note: Number of position holders in EUA derivatives, by counterparty sector.
Sources: ICE Endex, EEX, Nasdaq Oslo, ESMA.

CMR.29

Share of derivative positions by sector

64% of positions held by financials

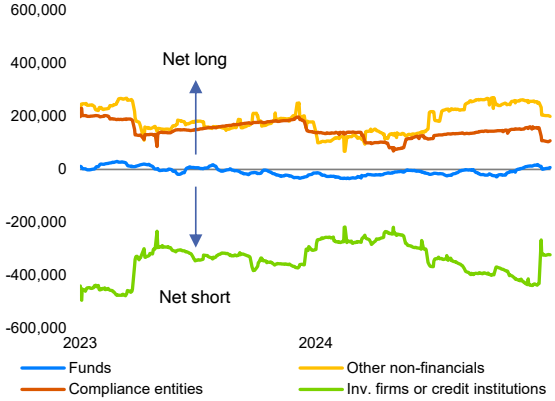


Note: Share of gross positions in EUA derivatives by counterparty sector.
Source: ICE Endex, EEX, Nasdaq Oslo, ESMA.

CMR.30

Net derivative positions by sector

Non-financials long, banks and inv. firms short

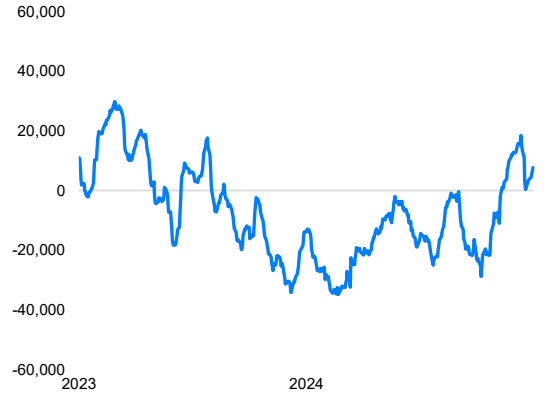


Note: Number of net positions in EUA derivatives held by counterparty sector, in lots (1,000 allowances).
Sources: ICE Endex, EEX, Nasdaq Oslo, ESMA.

CMR.31

Net derivative positions of investment funds

Funds turned net long in November 2024



Note: Number of position in EUA derivatives held by funds, in lots (1,000 allowances).
Sources: ICE Endex, EEX, Nasdaq Oslo, ESMA.

Deep dive – Counterparty classification and non-financial firms

To better understand the behaviours of carbon market participants, ESMA has developed a more granular **classification of non-financial counterparties**[10], shown in Table 1 below.

Table 1
Types of non-financial firms trading EUAs
Distinction of five categories

Sector	Description	# of firms
Utility firms	Suppliers of electricity and gas	429
Energy firms	Extract, produce, and distribute fossil fuels such as oil and gas	83
Commodity traders	Trade and transport raw materials to profit from market price differentials[11]	47
Transportation firms	Airlines and shipping companies	150
Other non-financials	Residual category, incl. industries such as cement and steel production	1,870

Notes: Types of non-financial sector firms trading EUAs in secondary markets. Sector based on RIAD classification Number of firms=single count of Legal Entity Identifiers across the different regulatory datasets used in the report.
Source: ESMA

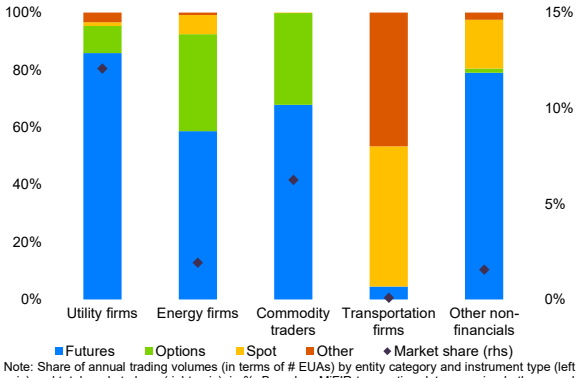
The classification allows us to explore the different trading strategies of non-financials, starting with the distribution of **trading volumes** (CMR.32) – keeping in mind that financial entities alone account for approximately 80% of volumes.

We observe a strong reliance on exchange-traded futures across all entity categories, with the exception of transportation firms, which acquire EUAs primarily through the spot market or via bilateral forward contracts – the main component of the "Other" category.

Moreover, we find higher levels of options trading among commodity traders, and energy firms – potentially reflecting more sophisticated trading strategies or a stronger emphasis on proprietary trading by these participants.

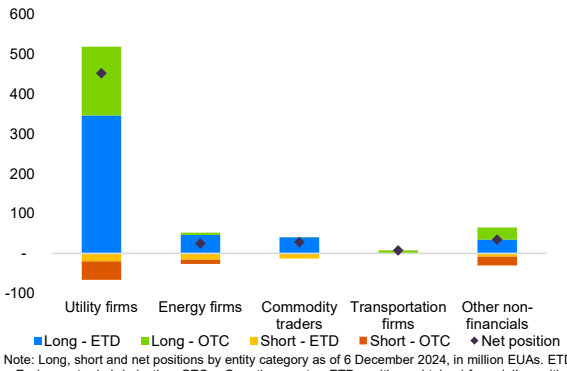
We next examine the **open positions** of non-financial participants.[12] Utility companies hold the largest shares of (gross) positions among non-financials (CMR.33).

CMR.32
Instruments traded by non-financials
Most trading in futures, followed by options



Note: Share of annual trading volumes (in terms of # EUAs) by entity category and instrument type (left axis) and total market share (right axis), in %. Based on MiFIR transaction data, covering both on- and off-exchange transactions. 'Other' comprises forwards, mini futures and CFDs.
Sources: ICE Endex, EEX, Nasdaq Oslo, ESMA.

CMR.33
Derivative positions
Utilities hold highest exposure



Note: Long, short and net positions by entity category as of 6 December 2024, in million EUAs. ETD = Exchange-traded derivative. OTC = Over-the-counter. ETD positions obtained from daily position reports of exchanges, OTC positions obtained from trade state reporting under the European Market Infrastructure Regulation (EMIR).
Sources: ICE Endex, EEX, Nasdaq Oslo, EMIR, ESMA

Utility firms hold almost exclusively long positions (against investment firms), mostly on-exchange, reflecting their preference for hedging compliance needs through futures markets. They also hold some short OTC positions, which may reflect either active sales or residual positions from the previously common cash-and-carry trade, which sought to profit from an upward-

[10] For an overview of the counterparty classification methodology, see the relevant Annex.

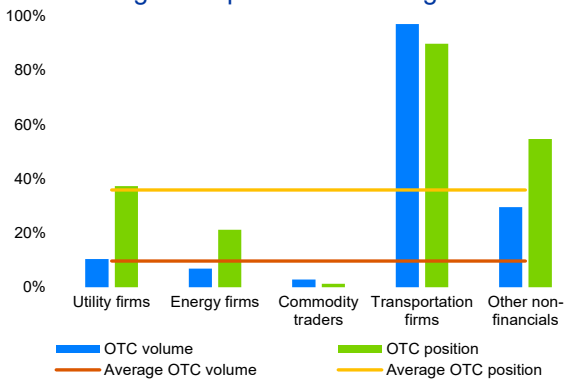
[11] We classify commodity traders as non-financials when not being licensed as an EU investment firm under MiFID.

[12] Based on a combination of daily position reports for on-venue derivatives and outstanding OTC contracts reported under EMIR by EU market participants as of early December 2024. OTC positions in EUA derivatives held by third-country firms may not be fully reflected in the data. However, we believe this part of the market to be relatively small.

sloping forward curve – and was particularly attractive during the low-interest rate era.[13] All other categories of non-financial participants show comparatively small exposures, which are for the most part net long and concentrated in on-venue instruments.

There are nonetheless some notable differences in **OTC activity** across participant categories, both in terms of trading volumes and open positions (CMR.34). Volumes thereby reflect participants' preferred mode of engaging in the carbon market, while reported positions offer a snapshot of their exposures, including counterparty risks.

CMR.34
OTC activity
Most trading takes place on-exchange



Note: Share of OTC trading volumes and OTC gross positions by entity category, in %. Trading volumes measured over the calendar year 2024 and gross positions as of 6 December 2024, both in terms of # EUAs. Gross positions defined as the sum of absolute values of long and short positions. Average of non-financials.
Sources: ICE Endex, EEX, Nasdaq Oslo, EMIR, ESMA.

On average, the OTC share of **trading volumes** undertaken by non-financials stands at 10%. Commodity traders exhibit the lowest OTC shares in volumes followed by energy firms, speaking for a high reliance on exchange trading. Notably, these participants are often domiciled outside the EU.[14]

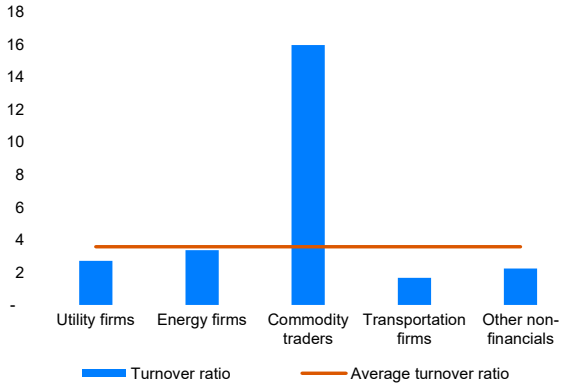
Utility firms show an OTC around the average, while transportation firms trade almost exclusively OTC. Other non-financials also tend to trade OTC relatively more often.

When it comes to **open positions**, the average OTC share among non-financials stands at 36%. Similarly to trading volumes, commodity traders and energy firms maintain a low OTC share.

For utility, transportation, and other non-financial firms, the OTC share in open positions is at or above average, aligning with their volume ratio.

We now focus on **turnover ratios** (CMR.35), defined as trading volumes relative to gross positions. These ratios provide insight into the degree of short-term profit seeking (i.e. trading) compared to long-term hedging or risk taking (i.e. exposure). A higher turnover ratio suggests more active trading – such as dealing/market making, arbitrage, or speculative trading – while a lower ratio typically reflects the prioritisation of hedging (or long-term bets).[15]

CMR.35
Turnover ratios
Commodity traders with highest turnover ratio



Note: Turnover ratio by entity category defined as annual trading volumes divided by gross positions as of 6 December 2024, both in terms of # EUAs. Gross positions defined as the sum of absolute values of long and short positions. Average of non-financials.
Sources: ICE Endex, EEX, Nasdaq Oslo, EMIR, ESMA.

As expected, and consistent with earlier findings commodity trading firms exhibit the strongest **profit-seeking** behaviour with the highest turnover ratios – the same level as investment funds. Utilities, energy companies, transportation firms, and other non-financial entities display instead lower turnover ratios, consistent with a primarily **hedging-oriented** participation.

In conclusion, while large utility and energy firms are active players in the market – and acknowledging that the distinction between hedging and risk taking is often subtle – their behaviour generally aligns with that of compliance entities managing real-world emissions exposures. In contrast, commodity trading firms appear to buy and sell more actively, while transportation companies and other non-financial firms tend to participate solely for hedging purposes.

[13] See also: Oxera, Carbon trading in the European Union, 2022.

[14] The reported OTC figures only cover trades or positions involving at least one EU-based counterparty. OTC transactions conducted exclusively between non-EU entities are not captured in the data. Moreover, OTC spot transactions not involving an EU investment firm (e.g. between two non-financial firms) are also out of scope.

[15] See also: Lucia, Julio J. & Mansanet-Bataller, Maria & Pardo, Ángel, 2015. "Speculative and hedging activities in the European carbon market," Energy Policy, Elsevier, vol. 82(C), pages 342-351.

Conclusion

Monitoring

Overall, the analysis has not unveiled any significant issue in the functioning of EU carbon markets. EUA auctions and trading dynamics remain largely unchanged, with the market organised in a way that facilitates the flow of EUAs from financial intermediaries to non-financial firms with compliance obligations.

The analysis shows a continuation of several trends already observed in ESMA's previous report. The annual average price of EUAs continued to decline and was down 22% overall in 2024 (-22%y/y), driven by weak demand from continued power sector decarbonisation, and higher EUA auction volumes. EUA prices stabilised after the first quarter of 2024, displaying elevated correlation levels with natural gas prices.

In 2024, 599mn allowances (+15% from 2023) were auctioned, amounting to EUR 39bn (-11%) due to the lower prices prevailing throughout the year. Volumes remained significantly concentrated across only a few market participants, with 90% of EUAs acquired by just 10 bidders.

Trading activity increased by 35% in 2024, reaching a total of 13.7 bn tCO2. Market growth was primarily driven by on-venue trading, while OTC trading activity was stable. Investment firms and credit institutions dominated both on- and off-exchange markets, accounting for 63% of total trading volumes – a 7 percentage-point increase from 2023.

Derivatives markets continued to play a key function in the EU ETS by facilitating the acquisition of EUAs by compliance entities from financial intermediaries. Central to this are futures contracts, which accounted for three-quarters of volumes traded in 2024. Meanwhile, options' share saw a modest increase of approximately 4 percentage points.

Throughout the year, there were on average 909 daily derivatives position holders, up from 783 in 2023. This included 453 investment funds holding just 6% of all positions, while investment firms and credit institutions held 51% of all positions (up 10 percentage points from 2023).

Policy recommendations

The ESMA 2024 report on EU carbon markets included two main policy recommendations to improve the transparency and monitoring of the EU carbon market. The limited availability of LEIs in the Union Registry to identify account holders pointed to the need for additional efforts by national administrators to ensure the timely implementation of the LEI registration requirement. However, the progress so far has been limited, with only 16% of new ETS account holders since last year recording an LEI. ESMA reiterates the same recommendation, given the importance of LEI availability in counterparty identification for risk monitoring purposes.

With respect to the reporting of transaction data, ESMA ran a public consultation on the revision of MiFIR RTS 22 seeking industry advice on the need to further clarify the reporting of strategies and transaction chains. The feedback received pointed to the inconsistencies with the approaches taken under the EMIR reporting regime and the challenges of implementing and correctly reporting these data elements across all counterparties in the reporting chain and strategies.

In light of the overall feedback received to the MiFIR review[16], ESMA concluded that the root of the problem is the siloed sectorial approach in the respective reporting frameworks, which led to misalignments in reporting logics. ESMA thus decided to launch a call for evidence for a more comprehensive review of reporting covering overlapping obligations across regimes with a view to reduce complexity and costs while enhancing data quality, sharing and usability.

Should the outcome of this work be incorporated by the European co-legislators in their upcoming legislative reforms, ESMA will also have the opportunity to address other issues identified as part of its EU ETS monitoring mandate in a comprehensive and consistent manner.

[16] See ESMA Final Report on RTS 22 on transaction data reporting under Art. 26 and RTS 24 on order book data to be maintained under Art. 25 of MiFIR.

Therefore, we encourage the European Commission, Council and Parliament to consider the recommendations stemming from the above-mentioned call for evidence in their upcoming legislative reforms.

Annexes

Data sources

To provide a comprehensive picture of carbon markets in the EU, this report makes use of multiple data sources. The first section on price and volatility makes use of public and commercial data. The second section use auctions data from the European Energy Exchange and collected by BaFin in accordance with Article 34 of the Auctioning Regulation.[17]

The sections on trading and on derivatives positions leverage (i) regulatory position data reported by EU trading venues under Article 58 of the Markets in Financial Instruments Directive (MiFID II), (ii) regulatory transaction data reported under Article 26 of the Markets in Financial Instruments Regulation (MiFIR), and (iii) regulatory transactions data reported by derivatives market participants under the European Market Infrastructure Regulation (EMIR). The scope, objectives and structure of the information reported under these regulatory reporting regimes differ, and the indicators featured in the report have been selected to provide readers with the most accurate depiction of secondary markets.

Where relevant, regulatory data have been enriched with external information, e.g. Legal Entity Identifiers (LEIs) from the Global LEI foundation and NACE sector codes sourced from the ECB's RIAD database.

Counterparty classification

The use of multiple regulatory datasets with different reporting scopes and contents required the development of a unique counterparty classification system. The classification mainly builds on the one used in the MiFID II weekly derivative position reports [18] and was further refined through consistency checks between datasets and manual lookups.

Each counterparty represents an independent legal entity appearing in at least one of the datasets used, identified by its LEI and allocated to one of the categories in the table below.

Most of the report relies on the level 2 classification, while the level 3 classification represents a further breakdown of non-financial counterparties and forms the basis for one of the deep-dive sections.

Level 1	Level 2	Level 3
Financial	Investment firms	
	Funds	
	Other financials	
Non-financial	Compliance entities	Utility firms
		Energy firms
	Other non-financials	Commodity traders
		Transportation firms
		Other non-financials
Unclassified		

Compliance entities thereby represent firms with compliance obligations under the EU ETS and investment firms and credit institutions must be authorised as such and are identified through public registers. [19] Investment firms and credit institutions also include equivalent third-country entities that are not directly authorised in the EU.

It is important to note that the level 2 classification is performed on a legal entity level and corporate groups can comprise multiple legal entities classified differently. For example, "other non-financials" active in carbon markets are in many cases part of and act on behalf of a larger corporate group with compliance obligations – usually representing their dedicated trading arms. However, the category of "other non-financials" also includes commodity trading firms that do not qualify as financial firms and without compliance obligations of associated entities.

The Level 3 classification assigns a single representative category to all entities within a corporate group. [20] It also removes the divide between compliance and other non-financial companies by grouping them into one sector. For example, under the Level 3 classification, the trading arm of a utility group is classified together with the rest of the group as a utility firm.

[17] Commission Delegated Regulation (EU) 2023/2830 of 17 October 2023 supplementing Directive 2003/87/EC of the European Parliament and of the Council by laying down rules on the timing, administration and other aspects of auctioning of greenhouse gas emission allowances.

[18] See MiFID II Art.58 on position reporting by categories of position holders.

[19] See ESMA registers, EBA registers, FCA registers.

[20] Corporate groups have been identified based on public relationship data from the Global Legal Entity Identifier Foundation (GLEIF): Level 2 Data: Who Owns Whom.

Data handling

ESMA screened and cleaned the data to ensure its accuracy for analysis. Firstly, ESMA identified and removed cancelled and duplicated transactions, retaining only pertinent data. Additionally, outliers identified in the “quantity” and “price” fields, caused by misreporting, were corrected to enhance the overall quality of the dataset.

Secondly, to compute more accurate monetary values for the trading strategies involving futures and reported with price deltas, ESMA adjusted the transaction prices by using most recent values involving the same instruments.

Lastly, ESMA mapped the Classification of Financial Instruments (CFI) using either the code reported in the Financial Instruments Reference Data System reference data or in MiFIR transactions data. This mapping facilitated further analysis and classification of the different categories of instruments in compliance with the CFI ISO 10962.

OTC trading is identified through the 'Venue' and 'Transmission of Order Indicator' fields. Subsequently OTC transactions are deduplicated by buyer ID, seller ID and timestamp. This approach is also intended to partially remove the duplicate reports originating from transaction chains which could be identified (for further details on the issue of transaction chain identification, see the ESMA 2022 and 2024 reports). Total OTC trading activity is then calculated as the aggregate volumes of the corresponding transactions.

In 2025 we designed an overall more thorough and consistent approach to retrieve reference data, define the scope of instruments, and clean the transactions, which can result in slightly different figures for 2023 compared to the ones published in the previous report.