

【欧州】 【Common】

Common - EU decarbonisation policy: The EU ETS and its reforms, the coverage of Scope 1 emissions and the impact of the EU ETS price of allowances on energy prices

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【概要 : Summary】

Covering around 10,000 installations in the energy-intensive industry and energy generating sector under a “cap-and-trade” market-based mechanism, the EU ETS has proven to be an important tool to achieving GHG emission reduction in Europe since its launch in 2005. Since 2012, the EU ETS system also regulates the emissions of aviation and in 2024, the maritime sector was added as well as a separate EU ETS2 for buildings and road transport was created under the EU ETS reform in 2023.

Regarding the emissions of the energy generating sectors, their Scope 1 emissions are covered by the EU ETS and operators are obliged to surrender allowances according to their emissions. Since 2013, electricity producers and power plants must pay the full EU ETS carbon price for covering their Scope 1 emissions, as they can pass on these additional costs to costumers. Instead, Scope 2 emissions for imported, purchased energy are not covered.

A study based on data generated before the pandemic and the Russian war in Ukraine shows the pass-through of carbon cost in the German and Polish liberalized wholesale electricity markets and the correlation of wholesale electricity and EUA prices seems to be rather

high with 75% and 79%, respectively. The cost pass-through in the electricity market stimulates the energy intensive industry to reduce their GHG emissions and the installations in the manufacturing industry keep decreasing their emissions. However, the pass-through of wholesale to retail prices is limited because of the structure of household contracts for end-users, which are usually agreed on for longer periods of time.

【記事 : Article】**1. The Scope 1 and Scope 2 emissions and the EU ETS coverage**

The GHG Protocol outlines three scopes for GHG emissions reporting, including Scope 1 covering direct emissions from company-owned or controlled sources, such as combustion in boilers and Scope 2 covering indirect emissions from purchased electricity consumed by the company (GHG Protocol n.d.). To calculate Scope 1 and 2 emissions, companies must account for onsite fuel use and purchased electricity (Scope 2) (Gowdy 2022).

In the EU, the EU Emissions Trading System (EU ETS) was established in 2005 under Directive 2003/87/EC as a “cap-and-trade” market-based mechanism targeting Scope 1 emissions from over

10,000 installations, including power plants and energy-intensive heavy industry sectors (Directive 2003/87/EC, Commission n.d.a).

The Commission Implementing Regulation (EU) 2018/2066, ANNEX IV, defines that operators of installations shall monitor CO₂ emissions from all types of combustion processes and any emissions from fuels used as process input (Commission Implementing Regulation (EU) 2018/2066). However, the “operator shall not assign emissions associated with the production of heat or electricity that is imported from other installations to the importing installation” (Commission Implementing Regulation (EU) 2018/2066). Accordingly, the Scope 2 emissions from imported heat or electricity are excluded from the EU ETS coverage (Commission Implementing Regulation (EU) 2018/2066).

2. Auctioning of EUAs and free allowances

Companies covered by the EU ETS must monitor, report and verify their GHG emissions and they are obliged to surrender emissions allowances (European Union Allowances, EUA) and transfer them to the EU’s central registry (European Commission n.d.c, LIFE ETX 2024). Companies partially purchase the EUAs to pay for their emissions at auctions, managed by the European Energy Exchange (Auctioning Regulation Commission Regulation (EU) No 1031/2010, repealed by Commission Delegated Regulation (EU) 2023/2830) (European Parliament 2023). Subsequently, the allowances can be traded in secondary markets, where operators, financial institutions or others can trade allowances (LIFE ETX 2024). All transactions are recorded in the Union Registry to guarantee accurate accounting of all allowances and to keep track of the ownership of allowances in electronic accounts (European Commission n.d.c, n.d.d).

Due to the excess of EUAs in the market in the past, the Market Stability Reserve (MSR)

(Decision (EU) 2015/1814) was introduced in 2019 to align the surplus supply of allowances with the demand (LIFE ETX 2024).

In Phase 3 of the EU ETS (2013–2020), auctioning became the main distribution method for allowances (European Parliament 2023). As of 2013, energy generating sectors and power plants are required to buy all allowances for covering their Scope 1 emissions as they were not entitled anymore to receive free allowances, as they can pass through the EUA costs to their consumers (LIFE ETX 2024, ECA 2020). However, Article 10c of Directive 2003/87/EC allows lower-income EU Member States including Bulgaria, Czechia, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovakia to grant free allocations for electricity production to support investments in the modernisation and sustainable transformation of the energy sector (ECA 2020, European Commission n.d.b). A part of EUAs is still distributed for free to some industrial sectors including cement, aluminium, fertilisers, hydrogen, iron and steel due to the risk of carbon leakage (COM (2023) 654 final, LIFE ETX 2024). However, free allowances will be phased out between 2026–2034 and replaced by the Carbon Border Adjustment Mechanism (CBAM) (CBAM Regulation 2023/956). For non-CBAM sectors, the European Commission will determine the new level of free allocations (FSR 2024).

3. The EU ETS Reform in 2023

Since its launch in 2005, the EU ETS has helped to reduce GHG emissions from industrial production, electricity and heat generation and by 37.3% (COM (2023) 654 final). In 2023, the EU ETS was amended in the context of the “Fit for 55” package and as part of the EU’s response to the energy crisis, caused by post-pandemic economic development and the start of the Russian war of aggression against Ukraine (Council of the EU n.d.). The reform of the EU ETS comprises of the core elements (Umweltbundesamt 2023):

1. Adjustment of the cap with an annual linear reduction factor (LRF) of 2.2 percentage points, up from the current 1.74 percentage points from 2021
2. Adjustment of the market stability reserve, free allocation and the use of auctioning revenues under the EU-ETS1
3. Introduction of a carbon border adjustment mechanism (CBAM)
4. Inclusion of maritime transport (EU-ETS1)
5. Reform of the rules for aviation (EU-ETS1)
6. Creation of a new EU ETS2 system for buildings, road transport and additional sectors (Umweltbundesamt 2023).

As of 2024, the EU ETS extends to the maritime sector and in 2025, shipping companies will surrender emission allowances, starting with 40% of the 2024 verified emissions (ABS 2022, European Commission n.d.a).

The new EU ETS' s total targets to reduce emissions from the sectors covered is set at 62% by 2030, compared to the previous EU ETS target of 43% reduction by 2030 (compared with 2005) (LIFE ETX 2024, European Commission n.d.a).

4. The use of EU ETS revenues

The revenues of the EUAs trading flow to national budgets of the EU' s 27 Member States according to a predefined division key (LIFE ETX 2024). In 2022, the EU ETS generated €38.8 billion in auction revenue, with €29.7 billion distributed to Member States. On average, 76% was spent on climate and energy projects, in line with the 75% average in 2013-2020 (COM (2023) 654 final). Previously, the ETS Directive required that at least 50% of auction revenue and all aviation allowance revenue be used for climate and energy projects (European Parliament 2023). The revised Directive 2003/87/EC from 5 June 2023 updated these spending rules (COM (2023) 654 final). Additionally, a share of the EU ETS revenue supports low-carbon innovation and the EU' s

energy transition via the Innovation Fund and the Modernisation Fund (European Commission n.d.e). These two funds have been established to support energy-intensive industrial sectors and the power generation sector in their innovation and investment towards the low-carbon economy. The Innovation Fund supports innovative low-carbon technologies in energy-intensive industries, carbon capture, use and storage of renewable energy, and energy storage (European Parliament 2023). The Modernisation Fund supports the modernisation of the electricity sector and energy systems from 2024 in 13 lower-income Member States (European Parliament 2023). Its budget comes from auctioning EUAs, and the revenues are allocated between the beneficiary Member States according to a fixed key (COM (2023) 654 final). From 2024, part of the auction revenue will also support innovations in the maritime sector to improve the energy efficiency of ships and ports, among others (ABS 2022).

5. The monitoring of Scope 2 emissions in installations, compensation of indirect carbon costs

The Commission Implementing Regulation (EU) 2018/2066 lays down rules for the monitoring and reporting of GHG emissions and activity data based on Directive 2003/87/EC in the trading period commencing on 1 January 2021 and subsequent trading periods (Commission Implementing Regulation (EU) 2018/2066).

Operators must track Scope 1 emissions from combustion sources like boilers and turbines but are not required to report Scope 2 emissions from purchased and imported electricity or heat (Commission Implementing Regulation 2018/2066). Consequently, under the EU ETS, power generators producing electricity are covered themselves for their Scope 1 emissions and must purchase allowances, but the Scope 2 indirect emissions from energy purchased by operators of energy-intensive industries are not covered by the EU

ETS (Commission Implementing Regulation (EU) 2018/2066).

In the first two phases of the EU ETS, operators of power generation plants got their allowances for free, and they could still pass on their notional carbon cost to their customers (ECA 2020). Consequently, the power generators benefited from windfall profits (ECA 2020, Umweltbundesamt 2024). Therefore, since 2013, the power generating sector must purchase all EUAs for covering their emissions. These additional costs incurred through the EU-ETS auctions are typically passed through to consumers including businesses, and industrial consumers (ECA 2020, Boute 2016). Consequently, although Scope 2 emissions are not covered by the EU ETS, the purchase cost of EUAs will incentivize both, the companies that import the electricity by reducing electricity consumption or by switching to cleaner energy sources, and also the power generation plants as they must compete with other providers in the liberalized EU energy market. However, based on the revised EU ETS State aid guidelines in 2020 covering 2021-2030, Member States can offer State aid to electricity-intensive industries to offset higher electricity prices (COM(2023) 654 final). In 2022, Member States paid €2.16 billion to industries to cover indirect carbon costs, but the beneficiaries were also obliged to reinvest a part of this aid into projects that lower their direct or indirect carbon footprint (COM(2023) 654 final).

6. The impact of the EU ETS' s allowance price on energy prices

In the past, energy monopolies and regulated prices in the EU' s energy market limited customer benefits from competition between energy companies (European Commission 2021). By connecting the EU' s 27 national energy markets in an integrated EU energy market, consumers

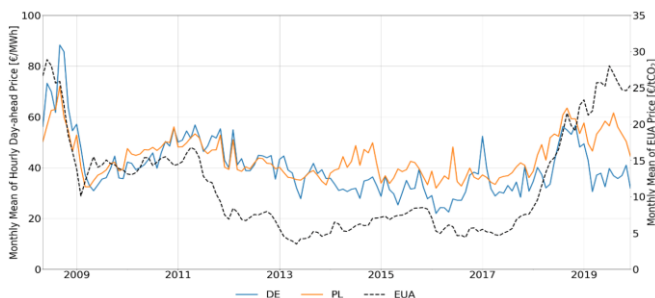
benefit from a free choice of electricity and gas suppliers (European Commission 2021).

The wholesale electricity price is one of the components of the final electricity bill paid by consumers, besides network costs as well as taxes and levies (European Commission 2021).

In the EU, the price rise of energy started in 2021 and reached record levels in 2022. This development was linked to the global increase of wholesale energy prices in the wake of the COVID-19 pandemic and growing international demand while the Russian invasion of Ukraine had an aggravating effect (Council of the EU n.d., COM(2023) 654 final). In 2021, gas volumes coming from Russia were significantly reduced, tightening the EU' s market and Gazprom offered little extra capacity to ease pressure on the EU gas market (European Commission 2021). From today' s perspective, the reduction of gas volumes from Russia was a preparation for the Russian war of aggression in Ukraine (Council of the EU n.d.). Reacting on the energy crisis and EU ETS price rise after 2021, the REPowerEU Regulation (Regulation (EU) 2023/435) was introduced, which includes measures to phase out the EU' s dependence on fossil fuel imports from Russia, to ensure the security of the energy supply, to promote energy efficiency and to accelerate the clean energy transformation (Regulation 2023/435). The REPowerEU Regulation included also a mobilization of the Innovation Fund to direct 27 millions of unallocated allowances from the Market Stability Reserve, which would otherwise become invalid to replenish the Innovation Fund (Regulation (EU) 2023/435). By June 2023, the Innovation Fund portfolio counted 69 projects that could save around 215 Mt CO₂eq of emissions in their first 10 years of operation (COM (2023) 654 final). A study by Abrell, Betz, and Kosch (2020) on “The European Emissions Trading System and the German and Polish Electricity Market. Influence of market structures and market regulation on

the carbon market. Case study report.” is based on data of pre-pandemic and pre-Russian war times (Abrell, Betz, Kosch 2020). Without the economic and geo-political impact of 2021 and 2022, the study by Abrell, Betz, Kosch (2020) can better examine the pass-through of carbon cost with competitive bidding in the day-ahead market in the German and Polish electricity markets. It aims to identify interdependencies between carbon market and the EU’s liberalized wholesale market, as an indicator whether power generators pass through carbon cost to the wholesale market. In fact, the study results show a high correlation between wholesale electricity prices and EUA prices of 75% in Germany and 79% in Poland, respectively, suggesting that power generators pass through their carbon costs onto the wholesale market (Abrell, Betz, Kosch 2020).

Fig. 1: Wholesale electricity and EUA prices



Sources: German day-ahead price: EPEX and <https://open-power-system-data.org/>; Polish day-ahead price: TGE; EUA: ICE daily forward prices obtained via Quandl (<https://www.quandl.com/>) and aggregated to monthly averages.

Source: Abrell, Betz, Kosch 2020, https://www.umweltbundesamt.de/sites/default/files/medien/5750/publikationen/2020_12_03_cc_48-2020_case_studies_eu_electricity_market.pdf

However, the pass-through of wholesale prices to retail prices is rather limited, because of the structure of household contracts, which are usually rather inflexible, and not adjusted on a short notice (Abrell, Betz, Kosch 2020).

A 2022 Commission market survey on the participation of operators in auctions and secondary markets showed that despite the disruption caused by the energy crisis the EU ETS has continued to function smoothly, and operators covered by the EU ETS were positive

about the current set-up for acquiring emission allowances through auctions and secondary market trading, while emissions from covered installations continued to decrease (COM(2023) 654 final).

In the EU’s liberalized energy market, passed-through carbon costs raise the cost of carbon-intensive energy, thereby promoting cleaner alternatives (Boute 2016).

7. Conclusion and considerations

The EU ETS sets a carbon pricing mechanism to reduce GHG emissions in energy-intensive industries, electricity and heat generation, aviation, and from 2024, maritime transport and municipal waste incineration. It regulates Scope 1 emissions, requiring companies to monitor, report, and cover them with allowances. Although Scope 2 emissions are not directly covered, the costs for purchasing allowances for covering Scope 1 emissions of power producers are passed through to energy intensive industries and other electricity consumers. This incentivizes companies to reduce electricity consumption or switch to cleaner energy sources. In a liberalized energy market like in the EU, also power generators are pushed to reduce Scope 1 emissions to stay competitive. In this way, although the EU ETS does not cover Scope 2 emissions, the system creates incentives for both, power producers and energy intensive industries and other consumers to invest in renewable energy and efficiency improvements. Moreover, under the Corporate Sustainability Reporting Directive (CSRD) (Directive (EU) 2022/2464), large companies must disclose Scope 2 emissions, and this could potentially lead to stricter regulations of Scope 2 emissions. The accounting of Scope 2 emissions is expected to encourage companies to consider the environmental impact of their energy consumption and the adoption of energy efficiency measures or the purchase of cleaner energy sources.

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