EFET Insight into the EU Emissions Trading System

What is the EU Emissions Trading System?

The EU Emissions Trading System (EU ETS) is a mechanism to account for, put a price on, and cut down carbon dioxide (CO_2) emissions. Carbon dioxide emitters covered by the scheme either need to purchase an emission allowance (EUA) for every tonne of CO_2 that they emit (as is the case for electricity production) or receive an amount of emission allowances for free (this includes part or all of the allowances required by industrial installations covered by the scheme).

The EU ETS is a market where European authorities fix an **overall cap on emissions**, which sets the supply of EUAs. Member States then **award part of these allowances for free** and **sell the remaining ones in an auction**.

In the auction, the volume of emission allowances for sale will be set by Member States, and EUAs will be awarded to the highest bidders. Emission allowances can then be re-negotiated, including those initially awarded for free, on a secondary market.

What does the EU ETS cover?

The EU ETS covers around **40% of the European Union's CO_2 emissions**.

Sectors covered

- Electricity & heat generation
- Industry (oil refineries, production of steel, iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, chemicals)
- Commercial aviation within EEA

GHG emissions covered

- carbon dioxide (CO_2)
- nitrous oxide (NO_2)
- perfluorocarbons (PFCs)

CO_2 emitters from electricity production and heat generation need to buy all of the EUAs that they need to cover their emissions. **CO_2 emitters from industries and civil aviation covered by the EU ETS** are awarded EUAs for free for part or all of their emissions, depending on performance benchmarks. The volume of EUAs they receive for free depends on their exposure to international competition from countries without carbon limitation measures to avoid the so-called "carbon leakage."

Participation in the scheme is mandatory for installations in the covered sectors, but there are exemptions for some small installations and where governments apply fiscal or other measures to achieve emission reductions.

Why do we use the EU ETS?

The EU ETS is a typical "cap-and-trade" scheme. Like other schemes in Europe (in Switzerland and the United Kingdom), but also in North America and Australia, the EU ETS allows:

→ *To put a limit on and curb CO_2 emissions in carbon-intensive sectors*

The "cap" in "cap-and-trade": With its cap on emissions, the EU ETS sets a maximum level of CO_2 that the sectors it covers cannot exceed. The cap decreases every year according to a linear reduction factor set in European legislation. As a consequence, CO_2 emitters covered by the EU ETS collectively curb their carbon emissions over time. Since the EU ETS was introduced in 2005, emissions in the sectors covered by the scheme have been cut by around 43%.
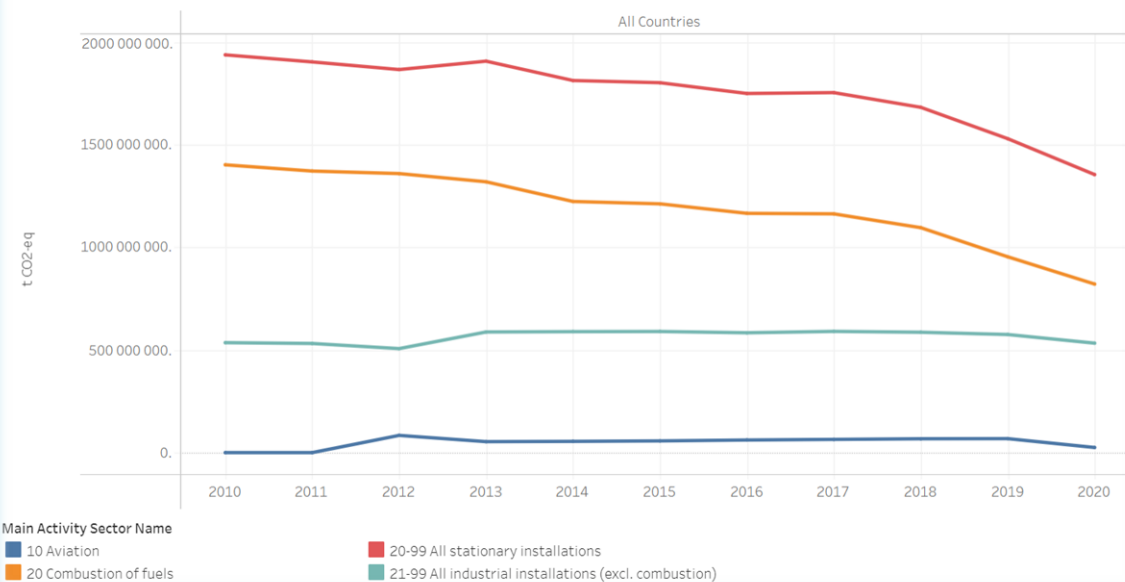

Figure 1: Greenhouse gas emission reductions in EU ETS-covered sectors, reaching -42,8% over the 2010-2020 period (Source: European Environment Agency).

By putting a price on CO_2 emissions, the EU ETS also gives an incentive for carbon emitters to reduce the CO_2 emissions of their operations at an individual level. If they reduce emissions, emitters would need fewer emission allowances and could resell excess allowances on the secondary market.

→ *To decarbonise at least cost*

The "trade" in "cap-and-trade": As a market, the EU ETS gives carbon a price based on supply (the EUAs put on the market by Member States) and demand (the EUAs needed by the concerned sectors). It represents the most accurate method to put a price tag on carbon, based on the objectives of capping and curbing CO_2 emissions in the European Union.

The EU ETS is also flexible over time, as it allows this price tag to adjust continuously to the evolution of supply (e.g., the decreasing EU ETS cap or stopping the allocation of free allowances) and demand (more or less production from carbon-intensive sectors).

"Cap-and-trade" vs. other carbon limitation measures

Simple carbon caps: Simple carbon caps set only a maximum limit on CO_2 emissions that cannot be exceeded in a sector or country. They fail to put a price on carbon (and have CO_2 emitters pay accordingly) or give a signal to curb emissions.

Carbon taxes: Carbon taxes are set at fixed rates for extended periods of time. Deciding on the right rate level is difficult: if a tax is set too low, it would not drive a behavioural change to curb CO_2 emissions; if a tax is set too high, it would drive behaviour change to curb CO_2 emissions, but at a higher cost to society. In both cases, carbon taxes would need to be readjusted regularly, creating regulatory uncertainty, which has a negative impact on investment decisions.

→ *To provide a single European price for carbon*

The "European" in "EU ETS": For the sectors that it covers, the EU ETS provides the same price for a tonne of emitted CO_2, whenever that emission occurs in the European Union.

The scheme has been the cornerstone of the Union's decarbonisation policy since 2005. While renewable energy support measures and energy efficiency measures are largely designed at the national level, the EU ETS provides an immediate signal for decarbonisation, and a long-term incentive to move away from investment in carbon-intensive activities that is common to the whole European Union.

How does the EU ETS work for the electricity sector?

As power generation in Europe is covered by the EU ETS – and similar cap-and-trade schemes in Switzerland and the United Kingdom – power generators using plants emitting CO_2 must buy EUAs corresponding to the carbon emitted when they produce electricity. Hence, they must add the price of carbon to the other operational costs of producing electricity when they sell their production.

Once purchased in a primary auction, EUAs can also be traded in a secondary market. This means that those power generators who reduce emissions can also benefit from their decarbonisation efforts by selling excess allowances to others, who emit more CO_2 than they initially expected.
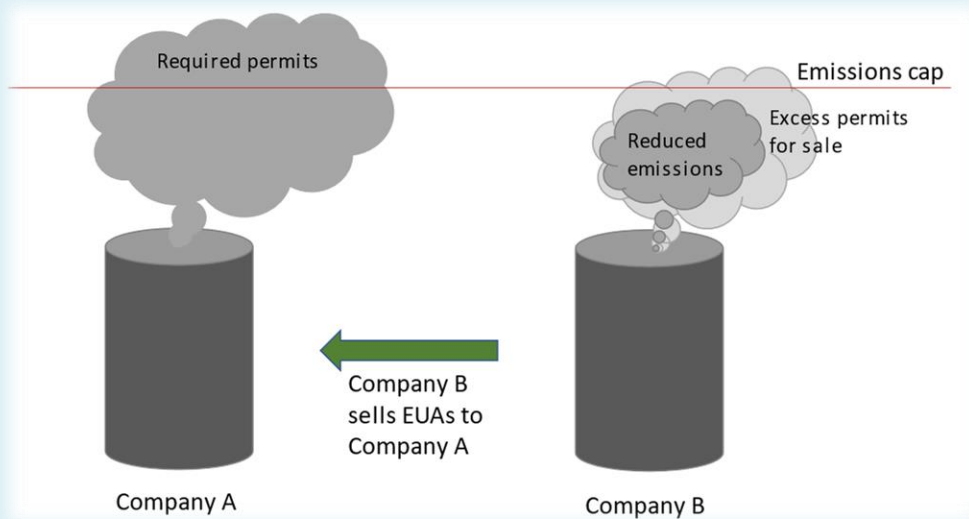
Figure 2: A company (B) reducing CO$_2$ emissions can sell excess emission allowances to another (A) on the secondary market.

What is the role of traders in the EU ETS?

Various intermediaries, such as investment firms and credit institutions (financial entities), can participate in the emissions market by offering a range of products that help CO$_2$ emitters to mitigate (or 'hedge') price risks.

Similar to hedging products on electricity markets,[1] hedging products in the EU ETS help CO$_2$ emitters covered by the scheme to mitigate the risk of short-term fluctuations (volatility) in the price of EUAs. The presence of traders in the EU ETS ensures that CO$_2$ emitters wishing to mitigate price risks can find a counterparty willing to take on that risk. This helps to reduce the overall risk in the market and lowers the cost of transactions in EUAs, which in turn translates into prices for EUAs which are lower than they may have otherwise been.

How does the EU ETS promote decarbonisation?

→ *By favouring electricity generation from renewable and low-carbon sources*

By adding the price of emission allowances to that of other operational costs of power generation, the EU ETS reinforces the signal to produce electricity first from renewable and low-carbon sources.

Pricing CO$_2$ emissions via the EU ETS also provides a financial incentive to improve the efficiency and hence, reduce the CO$_2$ emissions of existing carbon-emitting plants.

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[1] See our EFET Insight into Forward Trading in Wholesale Electricity Markets

→ *By stirring innovation and investment in line with our climate objectives*

The short-term effect of favouring the production of electricity from renewable and low-carbon sources also creates long-term benefits in the form of redirecting investment towards these technologies.

As renewable electricity generation grows, more options will be needed for when the wind does not blow and when the sun does not shine. During these periods, other fuels need to be used to generate or replace electricity, energy storage solutions need to be developed, and consumption needs have to be reduced/adapted. The EU ETS ensures that investment in back-up technologies (peak electricity generation, battery storage, or use of alternative energy sources, such as hydrogen) is directed towards low-carbon and carbon-neutral solutions. It also contributes to incentivising consumers to adapt their energy consumption patterns and sends signals for investment in new technologies and related services.

And what about the end-consumer?

The EU ETS creates an additional cost for the production of electricity from carbon-intensive sources, which is paid by consumers. This, however, is a minor component of the end-consumer bill – we estimate 5% to 15% in recent years. It weighs much less than other elements of the bill, such as taxes, levies (including for renewable energy support), and network charges – together about 66% of the average domestic European consumer bill.

How could we improve the EU ETS?

→ *By extending the sectors covered by the EU ETS*

Currently, the EU ETS limits emissions from more than 10,000 installations representing around 40% of the EU's greenhouse gas emissions.

However, sectors with significant emissions, such as road and maritime transport, buildings, and agriculture are currently not covered by the scheme. Future expansion of the EU ETS to all sectors of the economy which generate carbon emissions (and greenhouse gas emissions more broadly) will help to establish an economy-wide carbon price. This carbon price can become the long-term driver for decarbonisation across the European economy, encouraging the uptake of least-cost emission reduction technologies and solutions, and facilitating energy system integration.

→ *By linking the EU ETS with other carbon trading systems*

Currently, the EU ETS operates in the entire EEA area, including EU Member States, Iceland, Liechtenstein and Norway. The EU ETS has also been linked to the Swiss ETS since 2020, which allows mutual recognition of emission allowances between the two systems.

Linking the EU ETS to the UK Emissions Trading Scheme (ETS) would allow the reintegration of UK activities - covered by the EU ETS prior to Brexit - in a joint carbon pricing system. Further international linkages with Australia and certain US states and Canadian provinces would allow the EU ETS to be the building block of an international carbon price.

 In summary

The EU ETS is a cap-and-trade scheme that helps to reduce carbon emissions in the power generation sector, as well as in selected industries and in civil aviation.

Covering 40% of CO_2-emitting activities in the EU, it is a unique carbon pricing mechanism that forms the cornerstone of the Union's decarbonisation policy.

➢ The EU ETS is the most liquid carbon market in the world and it has demonstrated its ability to contribute to carbon emission reductions (-43% in the covered sectors since 2005).

➢ As a cap-and-trade scheme, it delivers emission reductions with greater cost-efficiency than the alternatives. It provides flexibility and rapidly adapts to the demand from covered activities, based on the overall supply of EUAs capped by European legislation.

➢ The carbon price remains an acceptable burden on end-consumer electricity bills, even in times of high energy and carbon prices as experienced in 2021/2022.

Expanding the scheme to new sectors would enhance innovation and further investment in clean technology. The EU ETS would also benefit from further linkages with other emissions trading schemes to broaden its reach, chief of which is the UK ETS.

For more information, feel free to contact us at secretariat@efet.org