

MFT Policy Brief 4 (EN)

How does European emissions trading system (EU-ETS) work and is it a good instrument to tackle the climate crisis?

Abstract:

It is the central instrument of European climate policy: the **European emissions trading system (EU-ETS)**. Conservative and liberal parties in particular see it as the key to achieving European climate targets. But how exactly does emissions trading actually work? Does it reliably lead to emission reductions, or does it only look good in theory but achieve little or nothing in reality? We want to explain this to you in this MFT Policy Brief.

How does it work in general?

There are different types of emissions trading systems, which differ greatly in terms of their environmental integrity¹. The EU ETS is a so-called "**cap and trade**" system. This means that each year the EU sets an emissions budget (the cap) that the economic sectors covered by the EU ETS must not exceed. The cap shrinks each year by a fixed percentage rate, the so-called **Linear Reduction Factor (LRF)**. Anyone who wants to emit CO₂ must buy **emission allowances**. One emission allowance (EUA = **EU Allowance**) corresponds to one tonne of CO₂. Every year in April, emitters must surrender the corresponding amount of allowances for their previous year's emissions. If they have not bought any, they have to pay penalties. In 2013, the penalties amounted to €100/tCO₂ and have since risen in line with the European Consumer Price Index (an indicator of inflation). In this way, the penalty last year was €128.71/tCO₂².

Emission allowances are auctioned by the EU and traded on **markets**. This results in a **fluctuating price**. In practice, this means that when the market price of certificates is high and the price of electricity is low, for example, lignite-fired power plants are shut down because the achievable sales price for the electricity would be lower than the price of the emissions certificate that would have to be paid to produce the electricity. Through this cost mechanism, the rising certificate prices gradually lead to a decline in fossil value creation. In the language of economists, one would say that CO₂ emissions are given "**opportunity costs**" through emissions trading. This means that the cost of emitting a tonne of CO₂ corresponds to the price that could be achieved by selling a certificate on the certificate market. Even if

¹ For further information, see MFT Policy Brief 10.

² EU-Directive 2008/101/EC from 11/19/2008, p. L 8/13, and EU-Directive 2009/29/EC from 04/23/2009, p. L 140/79.

companies are allocated allowances for free (which happens occasionally), they have an incentive to reduce their emissions and sell their allowances on the market instead.

The tradability of emission allowances means that emissions are saved where it is most cost-efficient. A company for which saving emissions is very expensive prefers to buy (the cheaper) certificates and continue to emit, while a company whose emission abatement costs are lower than the price of the certificates saves emissions.

Who has to surrender certificates for their emissions?

Are you now wondering whether you should have bought emissions certificates for your last purchase of petrol? Don't worry! As things stand today, only certain companies are subject to emissions trading. However, this will change in 2027. Let's take a closer look.

The emissions trading system (ETS₁), which has been in place since 2005, covers the following sectors: the **energy industry** (i.e. electricity generation), **energy-intensive industrial companies** (e.g. steel manufacturers), **intra-European aviation** and, since 2023, **intra-European maritime transport**³. This covers around **37% of the EU's total GHG emissions** and roughly **5% of global GHG emissions**⁴.

From 2027, however, a second emissions trading system (ETS₂) will be implemented that covers emissions from the **housing and transport sectors**⁵. Buying petrol and heating will then actually become more expensive. Nevertheless, car drivers, tenants and homeowners will not have to worry about buying certificates themselves. ETS₂ is (in contrast to ETS₁) a so-called "**upstream system**". This means that it is not the emitter itself, but the distributor of the fossil fuels (i.e. the petrol station or heating oil supplier) that has to buy and redeem the certificates⁶.

Together, ETS₁ and ETS₂ will cover around **75% of the EU's total GHG emissions from 2027**. There are also ideas to include **waste management** in ETS₂⁷.

What happens with the revenue from emissions trading?

The majority of the certificates are auctioned by the **member states**. Only 2% of the certificates are auctioned by the EU itself. This means that most of the proceeds from the sale of allowances go directly to the member states. Since 2023, the member states have been obliged to use the proceeds to **finance climate policy programmes**. In 2022, European emissions trading generated revenue totalling **€38.8 billion**⁸.

³ EU-Directive 2003/87/EC from 10/13/2003.

⁴ Verde, S. and Borghesi, S. (2022) 'The International Dimension of the EU Emissions Trading System: Bringing the Pieces Together' *Environmental and Resource Economics* 83, pp. 23 – 46, (S. 23 f.); Agora Energiewende und Agora Verkehrswende (2023): Der CO₂-Preis für Gebäude und Verkehr. Ein Konzept für den Übergang vom nationalen zum EU-Emissionshandel, (p. 13 f.).

⁵ EU-Directive 2023/959 from 05/10/2023, p. L 130/150.

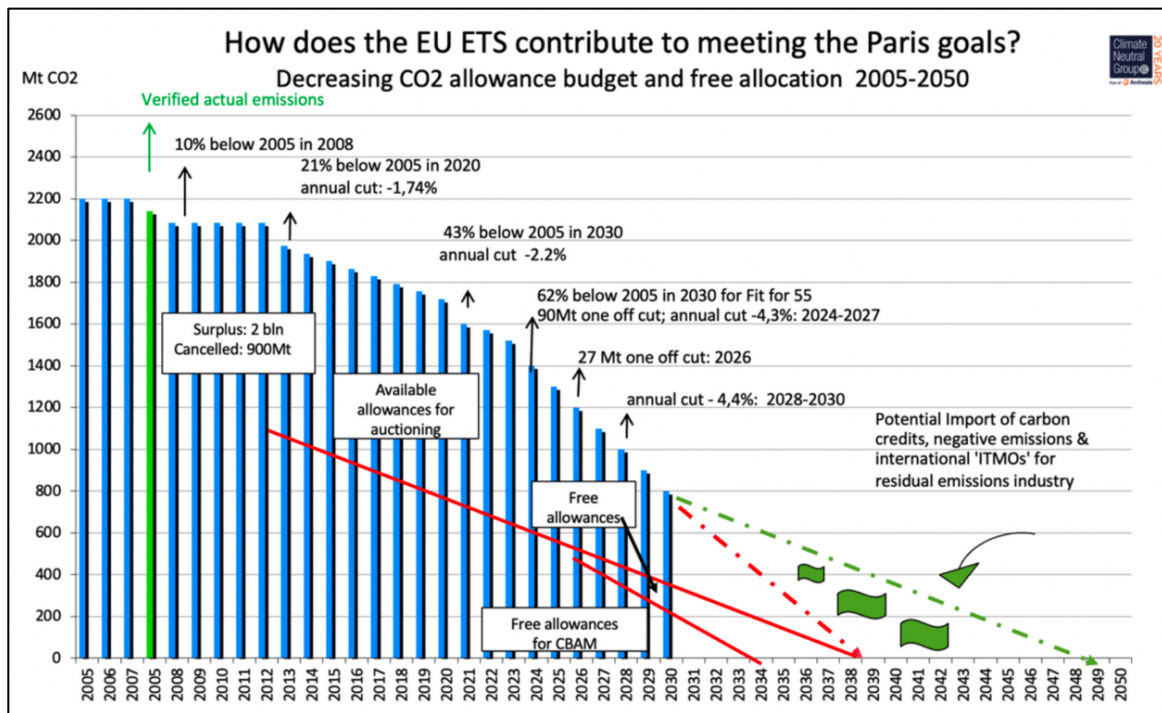
⁶ Ibid.

⁷ Agora Energiewende und Agora Verkehrswende (2023): Der CO₂-Preis für Gebäude und Verkehr. Ein Konzept für den Übergang vom nationalen zum EU-Emissionshandel, (p. 13 f.).

⁸ European Environment Agency (2024) „Use of auctioning revenues generated under the EU Emissions Trading System”.

And does it really help to mitigate climate change?

The short answer is: **Yes!** In the past, European emissions trading has often been criticised for not actually leading to any significant reductions in emissions. The criticism was justified for a long time, as the European emissions trading system had some serious weaknesses in its first two trading periods (from 2005 to 2012)⁹. As part of the "Fit for 55 package", however, the EU has made some substantial progress on the ETS.



Source: *emissierechten.nl*

The linear reduction factor in ETS₁ has been 4.3% since this year (4.4% from 2028)¹⁰. In ETS₂, the cap will shrink by 5.1% in the first year and then by 5.38% annually from 2028¹¹.

This means that the maximum amount of emissions that can be emitted in the European economy will decrease significantly each year. With the cap's currently defined shrinking path, CO₂ emissions from the ETS₁ sectors will have fallen to zero by 2039¹². In practical terms, this means that from 2039, the EU will only have climate-neutral electricity, steel, chemical products, etc. For the ETS₂ sectors (transport and buildings), the agreed reduction pathway means a 43% reduction in CO₂ emissions by 2030 compared to 2005¹³.

In contrast to a CO₂ tax or other forms of emissions trading, a cap-and-trade system such as the ETS is very **effective** and **reliably leads to emission reductions**¹⁴. This is simply because the shrinking cap means that a minimum reduction path is set by law. The decisive factors

⁹ Ellerman, A.D. et al. (2010) *Pricing Carbon: The European Union Emissions Trading Scheme*. Cambridge: Cambridge University Press.

¹⁰ EU-Directive 2023/959 from 05/10/2023, p. L 130/164.

¹¹ EU-Directive 2023/959 from 05/10/2023, p. L 130/183.

¹² Cozijnsen, J. (2023) *Tightening EU ETS leads to zero emissions before 2040*.

¹³ EU-Directive 2023/959 from 05/10/2023, p. L 130/151.

¹⁴ For further information, see MFT Policy Brief 10.

for the effectiveness and ecological integrity of a cap-and-trade system are that the **cap shrinks quickly enough**, that the **penalties for non-compliance** are high enough and that **no emission credits** from ecologically questionable climate protection projects can be used for compliance within the ETS.

Empirical evidence has shown that CO₂ emissions in the ETS sectors have decreased since the introduction of the ETS, although economic activity has increased (**absolute decoupling**)¹⁵. It is difficult to say whether these reductions can be attributed to the ETS alone. However, the emission reductions in the ETS sectors were significantly greater in the past than in the sectors not covered by the ETS. This suggests a **significant influence of ETS on emission reductions**.

What are the problems and where should EU-ETS be improved?

Has the current emissions trading system solved all the problems of European climate policy? No. Even if the ETS reliably leads to emission reductions, there are some things it cannot achieve. For example, it cannot guarantee that the burden of rising CO₂ prices will be distributed in a **regionally and socially equitable manner**¹⁶. Furthermore, it cannot prevent CO₂-intensive industries and companies from leaving Europe and producing their climate-damaging goods in countries that do not yet have carbon pricing, or consumers from switching to cheaper products from countries without carbon pricing. This is called "**carbon leakage**". In the past, the EU has tried to prevent carbon leakage by allocating **free allowances** to emission-intensive companies. With the so-called **Carbon Border Adjustment Mechanism (CBAM)**, the EU will introduce a new instrument from 2026 to prevent carbon leakage. We will further elaborate this in a separate article¹⁷.

A far more fundamental problem with the ETS is the question of whether its **reduction targets** (i.e. the cap shrinkage path) are ambitious enough. However, this is not a functional problem of the ETS, but merely a question of which linear reduction factors are applied and which sectors and emissions are covered by the ETS¹⁸. A problem that is directly related to the functioning of the ETS, on the other hand, is the question of whether "**carbon credits**" from climate protection projects inside or outside the EU (e.g. rainforest protection projects in Latin America) may be used instead of EUAs for compliance in the EU ETS. This could jeopardise the **ecological integrity** of the ETS¹⁹.

Conclusion:

The European Emissions Trading System (EU ETS) is an effective instrument of European climate policy that can be used to reduce CO₂ emissions reliably and predictably. At the same time, it ensures that emissions are reduced where the costs of avoiding emissions are lowest. This makes the EU ETS a climate policy instrument with great economic efficiency. Around 40% of European CO₂ emissions are currently covered by the ETS, and this

¹⁵ Meadows, D., Vis, P. and Zapfel, P. (2019) 'The EU Emissions Trading System' in Delbeke, J. and Vis, P. (eds.) *Towards a Climate Neutral Europe*. pp. 66 – 94, (p. 67).

¹⁶ For further information, see MFT Policy Brief 8.

¹⁷ For further information, see MFT Policy Brief 7.

¹⁸ For further information on the question, whether the EU climate targets are ambitious enough, see MFT Policy Brief 2.

¹⁹ For further information, see MFT Policy Brief 10.

proportion will rise to around 75% by 2027 with the introduction of the ETS₂. The current calibration of the ETS will lead to net zero emissions in the energy sector, energy-intensive industry, intra-European aviation and maritime transport by 2038. For other transport and the building sector, a 43% reduction in emissions compared to 2005 has been set for 2030. Problems with the ETS, some of which have already been addressed but some of which still need to be solved, are a socially fair distribution of the burden and carbon leakage. It is also questionable whether the current reduction targets of the ETS are compatible with the Paris Agreement and the goal of global climate justice.

Author: *Jonas Plattner*

Sources and further reading:

- Agora Energiewende und Agora Verkehrswende (2023): Der CO₂-Preis für Gebäude und Verkehr. Ein Konzept für den Übergang vom nationalen zum EU-Emissionshandel.
- Cozijnsen, J. (2023) *Tightening EU ETS leads to zero emissions before 2040*. (<https://www.emissierechten.nl/column/tightening-eu-ets-leads-to-zero-emissions-before-2040/>)
- Ellerman, A.D. et al. (2010) *Pricing Carbon: The European Union Emissions Trading Scheme*. Cambridge: Cambridge University Press.
- European Environment Agency (2024) „Use of auctioning revenues generated under the EU Emissions Trading System”. (<https://www.eea.europa.eu/en/analysis/indicators/use-of-auctioning-revenues-generated>)
- EU-Directive 2003/87/EC from 10/13/2003. (<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32003L0087>)
- EU-Directive 2008/101/EC from 11/19/2008. (<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0101>)
- EU-Directive 2009/29/EC from 04/23/2009. (<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0029>)
- EU-Directive 2023/959 from 05/10/2023. (<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023L0959>)
- Meadows, D., Vis, P. and Zapfel, P. (2019) ‘The EU Emissions Trading System’ in Delbeke, J. and Vis, P. (eds.) *Towards a Climate Neutral Europe*. pp. 66 – 94.
- Verde, S. and Borghesi, S. (2022) ‘The International Dimension of the EU Emissions Trading System: Bringing the Pieces Together’ *Environmental and Resource Economics* 83, pp. 23 – 46.