A 2030 outlook for Europe's mandatory carbon market

Driving impact and efficiency in the EU Emissions Trading System

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Abstract

As the world's largest mandatory carbon market, the European Union's Emissions Trading System (EU ETS) is a point of reference for global climate policy. In this white paper, we share a vision for an efficient and impactful mandatory carbon market in the EU, based on our deep expertise in carbon offsetting. We look at established targets, recent policy adjustments and external drivers to identify key challenges and predict the evolution of this market by 2030.

Introduction

The European Union's Emissions Trading System (EU ETS) is the oldest and largest mandatory carbon market, and as such, has become a point of reference for global climate policy.

As a market-based rather than top-down regulatory instrument the EU ETS has been praised for organically incentivizing decarbonization in private companies. Since its beginnings in 2005, the scheme has led to a 42.8% reduction in greenhouse gas emissions from the sectors it covers, including electricity, heat generation, commercial aviation, oil refineries, steel production and chemical products. This number shows that the cap-and-trade system works.

But the urgency of the climate crisis, the growth of decarbonization ambitions and unexpected power market shocks are placing unprecedented pressure on the EU ETS.

The scheme recently entered its fourth phase, set to last from 2021 to 2030. One of the main purposes of this latest phase is to align the EU ETS with the EU Green Deal's established target of reducing greenhouse gas emissions by 55% by 2030 from a 1990 baseline – a considerably more ambitious goal than the previous 40% reduction target. To rise to this enormous challenge (and meet the looming 2050 deadline for carbon neutrality), the EU ETS needs to grow from a functional but bureaucratic system to a commanding mechanism that can drive holistic climate action in the corporate world.

In this white paper, we share a vision for an efficient and impactful mandatory carbon market in the EU, based on ClimateTrade's deep expertise in carbon offsetting. We look at established targets, recent and upcoming policy adjustments and external drivers to identify key challenges and predict the evolution of this market by 2030.

The ABCs of EU ETS

- The EU ETS is a cap-and-trade system: organisations are only allowed to emit a certain amount of emissions, but they can trade allowances (EUAs), the ETS equivalent to carbon credits, with each other.
- Each EUA is equivalent to one ton of carbon dioxide (CO_2), and is priced by the market like any other commodity. At the end of the year, companies must have purchased as many EUAs as tons of greenhouse gases emitted beyond their capped allocation.
- The scheme covers specific gases and sectors where emissions can be accurately calculated: electricity and heat generation, energy-intensive industry sectors including oil refineries, steel works, and production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals, and commercial aviation within the European Economic Area.

2022-2023
Skyrocketing carbon prices drive digitization

The price of carbon permits in the EU remained relatively stable for the first 15 years of the EU ETS, oscillating between €5 and €25 a ton. But since the start of 2020, this number has risen to unprecedented levels. By March 2022, it had peaked at almost €100 a ton[1], having skyrocketed by more than 200% since the beginning of 2021.

One may think that the reason for this sudden rise is a stronger ideological focus on decarbonization, but the truth is, it is almost entirely market-driven: the soaring price of gas[2] has led many power generators to switch from low-carbon gas to high-carbon coal, resulting in increased demand for EUAs to comply with regulation. At the time of writing, sanctions imposed on Russia as a result of its invasion of Ukraine has led to more record highs in gas prices, signaling a continuation of this trend.

[1] Trading Economics, EU Carbon Permits (March
[2] Trading Economics, EU Natural Gas (March 2022)

On top of this, some entities with a surplus of EUAs are holding off from selling them[3], in fear that upcoming policy changes could cut free allowances and lead to a shortage of carbon permits. Indeed, the EU ETS is currently giving free allowances to certain industries (particularly manufacturing) to avoid them offshoring production to places where it is cheaper to pollute, something the EU called "carbon leakage". Analysts estimate that between 300 million[4] and one trillion euros' worth[5] of allowances will be allocated between 2021 and 2030. But now, the proposed Carbon Border Adjustment Mechanism is meant to replace these allowances by imposing a carbon tax on all products entering the EU, in effect levelling the playing field between EU and non-EU production and preventing carbon leakage.

In this context, analysts expect the rise in the carbon price to continue, with some predicting prices of up to €150 a tonne by 2030. In order to maintain EU competitiveness in this high-price landscape, the EU ETS needs to increase its efficiency and lower ancillary costs.

Transaction costs

There is very little public information around transaction costs for purchasing, selling or cancelling carbon credits in the EU ETS. Some studies published around 2010 attempted to calculate transaction costs by surveying companies in a specific country or sector, but found that answers varied too much to be generalised.

However, a June 2020 working paper[6] published by the London School of Economics offers a more comprehensive and quantitative approach to understanding EUA transaction costs. The authors, which analysed annual transaction and compliance data over Phase II of the EU ETS (2008-2012), developed a model to include transaction costs in emissions trading price predictions: costs of around €10,000 per year plus €1 per permit traded allowed them to reach the most accurate predictions.

Currently, firms can purchase EUAs on primary markets (via auctions) or trade on secondary markets (in organised exchanges or over the counter). Over Phase II (2008-2012), the yearly averaged total trading volume amounted to 5.6 billion EUAs, of which about 40% were traded over the counter and 60% on exchanges. Firms may also delegate their carbon trading activities to registered brokers, though it is unclear what percentage of companies do so.

[3] IHS Markit, EU carbon prices surge in H2 2021 amid power, policy shifts (January 2022)
[4] http://etxtra.org (March 2022)
[5] Sandbag: EU ETS Revenues: Who receives what? The trillion euro question (February 2022)

The transaction costs mentioned above, which include exchange membership fees, resources invested in operating a trading desk, monitoring the market and defining a trading strategy, as well as search, information, brokerage, intermediation and consultancy costs, are a barrier to entry from the EUA market. About 30% of regulated firms comply with the ETS without entering the market to trade – purchasing allowances on a bilateral basis. Additionally, even the companies that do engage in trade do so only a few times a year and only for sufficiently large volumes, suggesting that transaction costs are prohibitive for small volumes.

Fully digitising the process of purchasing or trading EUAs would lower barriers to entry and transaction costs, as well as revolutionising transparency around brokerage fees. In essence, it would make it possible to replace traditional brokers with an open, user-friendly digital platform, opening the market to smaller players and ensuring fairness in carbon permit prices.

Blockchain digitization

Blockchain technology is becoming the infrastructure of choice in financial markets, since all transactions recorded on a distributed ledger are immutable, reducing fraud risks.

Because of these transparency and traceability benefits, we know blockchain technology will become the preferred infrastructure for both voluntary and mandatory carbon markets, including the EU ETS. This technology involves the tokenization of carbon offsetting transactions in order to record them on-chain. While distributed ledger technology can be perceived as very complex, users of such carbon trading platforms do not need to be blockchain-savvy, as long as they can use fiat currencies to purchase carbon credits.

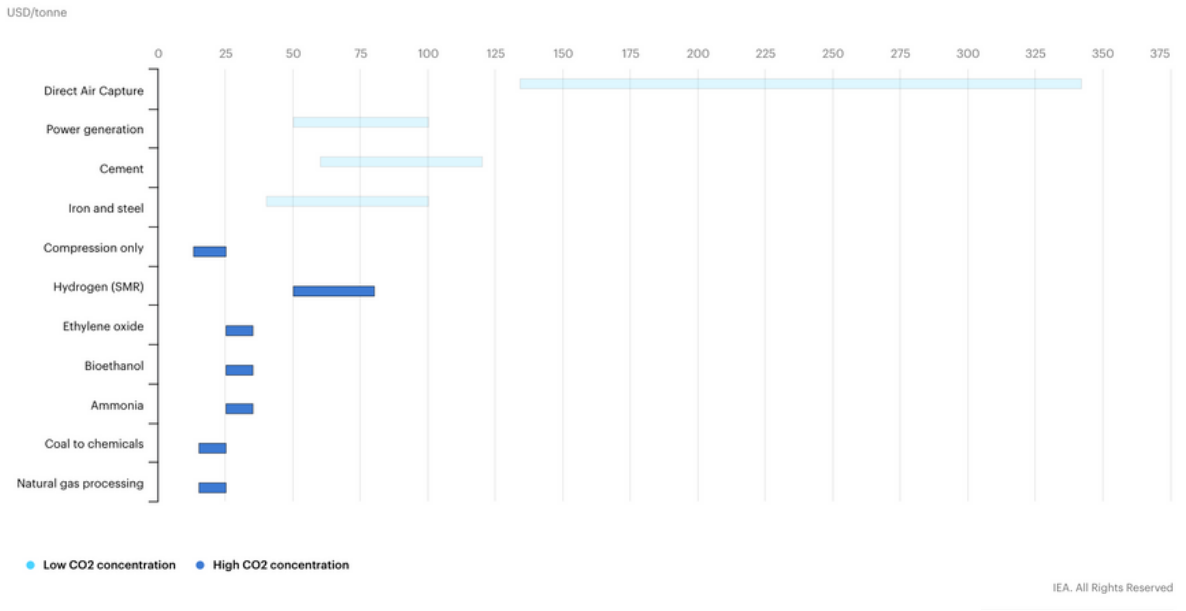
Already, several players offer blockchain-based carbon offsetting products in the voluntary market. ClimateTrade was the first to do so in 2017, connecting the developers of mitigation and adaptation projects that want to sell their carbon credits to companies that need to offset their footprint without intermediaries, reducing transaction costs by more than 40%. The added benefit of the platform is that it avoids double-accounting, since certificates are cancelled in the registry before sellers can get paid. It also allows the immediacy of peer-to-peer transactions, for the benefit of those who work on the field every day to preserve the planet.

[6]Grantham Research Institute on Climate Change and the Environment, Emissions trading with transaction costs (June 2020)

In 2021, ClimateTrade began to connect to the EU ETS market through the European Energy Exchange (EEX), and achieved authorization of clearing services by Raiffeisen Bank, with plans to deepen its integration of the EU's mandatory carbon scheme in 2022. This type of development will lead to the disruptive digitization of the EU ETS, increasing its efficiency and dramatically lowering transaction costs – a necessary improvement given the current EUA price environment.

On-site carbon capture technology

Another way companies could look to lower the cost of complying with the EU ETS in the coming years is by capturing carbon directly on-site. Much investment has gone into research and development for this technology in recent years: in 2020 governments and industry committed more than US$ 4.5 billion to it. As a result, its cost has lowered significantly. According to the International Energy Agency[7], direct air capture remains the most expensive type of carbon capture technology, at around US$134 to US$342 per ton of CO2.



However, innovative devices such as the ones offered by Mexican firm Biomitech (and distributed in Europe by ClimateTrade), which uses algae's photosynthesis and filtration power to clean the air, have managed to reduce this cost to as little as US$30-US$60 per ton, making on-site carbon capture technology a viable option for reducing the need for expensive allowances in the EU mandatory carbon market.

[7] IEA, Levelised cost of CO2 capture by sector and initial CO2 concentration, 2019 (November 2021)

2023-2026
Carbon Border Adjustment Mechanism urges focus on offset traceability

In the medium term, the main change expected to impact the EU's mandatory carbon market is the implementation of the Carbon Border Adjustment Mechanism (CBAM)[8]. The new legislation is currently set to come into force in 2026 after a three-year transition, but proposed changes would move this date forward to 2025[9], considering the higher risk of carbon leakage in a high-price environment.

The implementation of this mechanism would coincide with the phasing out of free allowances under the EU ETS, and require EU importers to purchase certificates equivalent to the weekly EU carbon price. During the transition period, starting in 2023, importers would be required to report emissions, with a system of monitoring, reporting and verification ensuring accurate reporting of carbon footprint.

As it stands, the CBAM would only apply to direct emissions (scope 1) released during the production process, to limit the administrative burden of compliance. However, the European Commission has stated that the CBAM may be extended in future iterations to include indirect emissions from purchased energy (scope 2).

The CBAM would initially apply to imports in five emissions-intensive sectors deemed at greater risk of carbon leakage: cement, iron and steel, aluminium, fertilisers, and electricity. The CBAM charge would cover imports of these goods from all non-EU countries, except those participating in the ETS or a linked mechanism (currently Iceland, Liechtenstein, Norway and Switzerland).

Aside from avoiding carbon leakage, the CBAM aims to incentivize non-EU countries and companies to put in place greener policies and reduce their emissions. As a result, its implementation is expected to greatly increase the scope of the EU ETS, and with that, its complexity.

[8]European Parliament, EU Carbon Border Adjustment Mechanism - Implications for climate and competition (February 2022)

Traceability of carbon credits

In a world where all products entering the EU have to pay a carbon tax, global producers looking to sell to Europe will likely start offsetting their emissions long before their products reach the shores of the continent, in a bid to maintain competitiveness with EU producers. In this context, reporting on carbon offsetting activities will become more crucial than ever. The bureaucratic burden of the CBAM would mostly be borne by EU importers, who would be responsible for calculating and reporting carbon emissions in line with EU requirements, and procuring CBAM certificates for each metric tonne of CO2. They will therefore request clear and transparent information from third-country exporters, and this is where carbon offset traceability becomes most relevant.

As mentioned above, blockchain technology allows end-to-end traceability of carbon credits: offsetting transactions can be tokenized to generate an immutable blockchain key with both project and vintage data. This will tremendously facilitate the work of regulators and importers when it comes to CBAM compliance.

Aside from digitization to ensure traceability and accountability, another trend is likely to emerge as the CBAM increases the complexity of mandatory carbon markets and begins to harmonise global carbon credit prices: companies are likely to prefer local projects to offset their emissions.

This is a tendency already noticed in the voluntary market: when given a choice, companies tend to prefer projects in their own country to offset their carbon footprint. Choosing local projects reflects positively on brand image, as this proximity tends to make carbon offsetting more impactful in the eyes of consumers.

In a more complex mandatory carbon market, this may become less of a preference, and more of a necessity. There's no better traceability than buying something next door, so as the CBAM increases carbon reporting requirements, it is likely that companies around the world will look for projects closer to home. This trend will be accentuated by the beginning of a certain standardisation of carbon prices, since all products that end up in Europe will pay the same tax on carbon emissions.

Augmenting carbon credit supply

As mentioned above, the CBAM is expected to significantly increase the scope of the mandatory carbon markets, encompassing not just EU companies but also their non-EU providers. The mechanism is part of the EU Commission's Fit for 55 package, which proposes expanding the EU ETS to align it with the goal of reducing GHG emissions in the EU by 55% by 2030. But Fit for 55 goes much further than this.

The plan also includes: reducing emissions from sectors already included in the scheme by 61% by 2030, compared to 2005 levels (involving annual emissions reduction of 4.2% as opposed to the 2.2% annual reduction under the current system); expanding the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) to all international flights operated by EU-based airlines (as opposed to only those within the European Economic Area); expanding the ETS to cover maritime activities; and creating a parallel ETS for road transport and buildings from 2025.

This will of course incentivize deeper decarbonization, but it will also increase demand for EUAs, at least temporarily. In order to meet this demand, carbon credit supply will need to be massively scaled up, which will require the fast and digital verification and certification of carbon mitigation projects.

In early 2022, ClimateTrade conducted a proof of concept (PoC) with Spain's stock market operator BME for the digital monitoring, reporting and verification (D-MRV) of a photovoltaic project in Spain. Specifically, the project developer communicated all the necessary information via a digital questionnaire based on blockchain, which guaranteed the immutability of the data. An independent verifying entity then verified the data and sent it to the certification entity, which was able to emit certification digitally.

D-MRV now needs to be tested with other types of climate mitigation projects, but the success of this PoC lays the bases for digitising the verification and validation process for projects that generate carbon credits, making it more efficient and transparent, and guaranteeing the quality of carbon credit supply in national registries.

This type of innovation will be necessary to expand the supply of EUAs without compromising their quality or traceability under the next phase of the EU ETS.

[9] European Commission, Amending Directive 2003/87/EC (2021)

2027-2030: Mandatory and voluntary markets converge into a one-stop-shop for climate action

By 2030, all free allowances within the EU ETS will have ended, and we expect the corporate world to have adjusted to the CBAM. Any temporary shock resulting from its implementation should have been absorbed, and in this maturing market, companies' voluntary and mandatory carbon offsetting activities could begin to converge.

It's important to note that the innovations mentioned above – among which blockchain digitization and traceability, localised carbon capture solutions, and digital verification of climate projects – will benefit not only the mandatory market, but all carbon offsetting activities. As a result, the standards and expectations of suppliers and buyers of carbon offsets the world over will become more harmonised, helping the overall carbon market become more streamlined and mature.

This will make it easier for companies to navigate the offering, and result in more efficiency in all carbon transactions.

Diversifying climate action

The EU Commission may see this maturing as an opportunity to shift its focus from carbon to the many other issues causing climate change. For instance, as part of the European Green Deal and its Farm to Fork Strategy, the Commission is working on a legislative framework for sustainable food systems,[10] which is due to be adopted by the end of 2023. Europe's biodiversity strategy[11] involves establishing larger areas of protected land, restoring nature and improving biodiversity quantification. And the EU is also known for its legislative action against plastic pollution, with a ban on single-use plastics that came into effect last year.[12]

We believe that in the long term, these separate strategies will become more interconnected with each other, as well as with the EU's carbon legislation. New types of climate offsets and credit systems could emerge, linked to soil health, crop diversification or biodiversity measures.

[10] European Commission, Agriculture and the Green Deal (March 2022)
[11] European Commission, Biodiversity strategy for 2030 (March 2022)
[12] European Commission, Single-use plastics (March 2022)

In essence, the European environmental action plan could turn into a comprehensive trading system that goes much beyond GHG emissions to include all aspects of sustainable development in the face of climate change.

In this context, and considering the gradual merging of the voluntary and mandatory carbon markets, companies will benefit from the current development of efficient and scalable digital platforms for climate mitigation.

A data-driven one-stop-shop

The digitization taking place in carbon markets is facilitating the collection of new data, around which types of offset projects are favoured, which credit vintage, or which ancillary benefits buyers look for – for instance, alignment to specific Sustainable Development Goals. This data will be incredibly valuable when it comes to matching offer and demand in a complex regulatory environment addressing many aspects of climate action, such as what the EU is slowly growing towards.

Imagine a visually pleasing, user-friendly dashboard where sustainability managers could see all their company's climate activities in one glance: carbon and plastic offsetting, contribution to biodiversity or sustainable agriculture projects or even water credits. Connection to the Internet of Things would provide real-time visibility on the performance of these activities, and the tokenization of all data on the blockchain would ensure end-to-end traceability, making reporting quick and seamless.

We believe this large-scale, data-driven digitization, led by the EU's legislative ambition and powered by private-sector innovation, is what the continent – and the world – needs to achieve meaningful and long-lasting change in the midst of the climate crisis.

Conclusion

While the stated topic of this white paper is the evolution of Europe's mandatory carbon markets, predicted market improvements around blockchain digitization, carbon capture innovation, carbon offset tokenization and data collection are set to revolutionise much more than just the EU ETS.

Combined with legislative changes that will expand the scope of European climate policy beyond the continent's borders, these innovations have the power to unlock efficient, interconnected climate action for companies the world over.

ClimateTrade is the only company in Europe facilitating carbon offsetting in both the voluntary market and the EU ETS through blockchain. As such, we are at the forefront of these developments. Our experience and leadership in voluntary carbon markets worldwide since 2017, and in the EU's mandatory carbon market since 2022, puts us in a unique position to meet the rising demands of multinational corporations through cutting-edge technological and commercial innovation.

We sincerely hope you will join us in the journey.

About the authors

ClimateTrade is a blockchain-based marketplace helping companies achieve their decarbonization goals by financing certified carbon offsetting and climate-regenerative projects around the world.

With offices in Valencia, Miami and soon in Seoul, ClimateTrade counts global brands Cabify, Banco Santander, Telefónica, Correos and Telégrafos, Prosegur and many others as clients. A pioneer in the development of exponential digital climate solutions, the company recently launched an API and Widget to allow companies to offer carbon-neutral products and services to their customers.

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