

# EU EMISSIONS TRADING SYSTEM (ETS) PRIMER

August 2021

The EU Emissions Trading System (ETS) is the largest and first carbon emissions trading system in the world. In 2020 this market accounted for 88% of total value of all carbon emission trading systems globally with 8 billion emission allowances changing hands, with a market value of €201bn<sup>1</sup>.

The legislation around the market is constantly evolving. The European Commission's goal to become carbon neutral by 2050 and reduce greenhouse gas emissions by 55% from 1990 levels by 2030 has inspired the latest round of legislative changes that were announced in July 2021.

We expect:

- + The scope of the European carbon market to expand
- + The supply of allowances (or permits) to emit carbon to shrink
- + The price of allowances to rise and thus help policy makers deliver on their promises to decarbonise and become emissions net neutral by 2050

## CARBON PRICING MECHANISMS ARE A CENTRAL PART OF THE GLOBAL EMISSION REDUCTION POLICY TOOLKIT

Carbon pricing mechanisms are becoming a ubiquitous part of the toolkit to tackle climate change. The higher the cost of a 'permit' or 'allowance' to produce carbon, the greater the incentive to implement abatement technology to reduce carbon output. There are several methods of achieving lower emissions (see [Box 1](#)), but the 'cap and trade' strategy is one of the most favoured today. According to the World Bank, a total of 64 carbon pricing instruments are now in operation around the world, covering over 20% of global greenhouse gas (GHG) emissions and generating \$53 billion in revenue<sup>2</sup>.

The World Bank data reveals the market is heavily fragmented and that represents some challenges. Firstly, there is no global price for carbon. That could incentivise some carbon emitters to change location of production to places where the cost of carbon cheaper (carbon leakage). Secondly, the less mature and less liquid carbon markets carry a lower carbon price. The social cost of under-priced carbon mechanism is the overproduction of carbon.

<sup>1</sup> Source: Refinitive Carbon Market Year in Review 2020, January 2021. Includes futures but excludes options.

<sup>2</sup> <https://www.worldbank.org/en/news/press-release/2021/05/25/carbon-prices-now-apply-to-over-a-fifth-of-global-greenhouse-gases>

The majority of carbon prices remain far below the High-Level Commission on Carbon Pricing's recommended range of \$40-80/tonne CO<sub>2</sub> equivalent (tCO<sub>2</sub>e) for 2020 to meet the 'well below 2°C' temperature goal of the Paris Agreement. At this point, carbon prices in the recommended range cover less than 5% of global emissions. Currently the European Union's carbon ETS sits within this corridor with EU Allowance prices at €56/tCO<sub>2</sub>e (\$66/tCO<sub>2</sub>e)<sup>3</sup>.

## THE EU EMISSIONS TRADING SYSTEM IS THE LARGEST CARBON MARKET, OFFERING UNRIVALLED LIQUIDITY

The permits to produce greenhouse gases that are traded under the ETS are called Allowances (EUAs). The volume of trading in EUAs and futures based on EUAs is considerably larger than any other carbon market (see table below). The size and liquidity of this market offers investors and users the best trading experience. With the global carbon market being so fragmented, we believe EUAs are leading the blueprint for a well-functioning cap and trade emission system. The EU ETS is aided by a sizeable futures market which promotes the price discovery process so that carbon is correctly priced to reflect current policy ambitions.

## GLOBAL CARBON MARKET SIZE 2018-2020 (INCLUDING FUTURES WHERE AVAILABLE)

MILLION TONNES CO <sub>2</sub> EQUIVALENT (MT) AND MILLION EUROS									
	2018		2019		2020		Volume change	Value change	Share of total value
	Mt	€ million	Mt	€ million	Mt	€ million	2019-2020	2019-2020	
Europe (EUAs, aviation EUAs) <sup>a</sup>	7,754	129,736	6777	168,966	8,096	201,357	19%	19%	88%
CERs <sup>b</sup> (primary and secondary)	15	32	12	40	16	61	33%	53%	
North America (CCAs <sup>c</sup> , RGGIs <sup>d</sup> )	1,126	12,871	1,673	22,365	2,010	26,028	20%	16%	12%
South Korea	51	809	38	744	44	870	16%	17%	
Chinese pilot schemes (allowances and offsets) <sup>e</sup>	103	194	130	249	134	257	3%	3%	
New Zealand	23	299	30	433	30	516	0%	19%	
<b>Total</b>	<b>9,062</b>	<b>14,3847</b>	<b>8,660</b>	<b>192,797</b>	<b>10,330</b>	<b>229,089</b>	<b>19%</b>	<b>19%</b>	

<sup>a</sup> Volume and value of EUAs excludes option positions

<sup>b</sup> Certified Emission Reductions

<sup>c</sup> California Carbon Allowance

<sup>d</sup> Regional Greenhouse Gas Initiative. The units traded in the Regional Greenhouse Gas Initiative are short tons, which are 0.907 metric tonnes. For unit consistency, we have converted RGGI's total volume figures to metric tonnes.

<sup>e</sup> The value for Chinese market includes allowances only.

All non-European transactions are priced in local currencies, for the sake of consistency we have converted values into euros.

<sup>3</sup> Based on EUA Daily Settled Futures, which is the closest concept to spot prices for this market. Data as of 23/08/2021.

Source: Refinitiv Carbon Market Year in Review 2020, January 2021. **Historical performance is not an indication of future performance and any investments may go down in value.**

## THE EU EMISSIONS TRADING SYSTEM

The EU Emissions Trading System (ETS) was set up in 2005 and therefore is the world's oldest emissions trading system.

The EU ETS works on the 'cap and trade' principle. A cap is set on the total amount of certain greenhouse gases that can be emitted by the installations (or companies) covered by the system. The cap is reduced over time so that total emissions fall.

Within the cap, companies buy or receive emissions allowances, which they can trade with one another as needed. Each allowance permits the holder to produce 1 tonne of carbon equivalent greenhouse gases (tCO<sub>2</sub>e). The limit on the total number of allowances available ensures that they have a value.

After each year, a company must surrender enough allowances to cover fully its emissions, otherwise heavy fines<sup>4</sup> are imposed. The companies covered the scheme have a legal obligation to participate. If a company reduces its emissions, it can keep the spare allowances to cover its future needs or else sell them to another installation that is short of allowances.

Trading brings flexibility that ensures emissions are cut where it costs least to do so. A robust carbon price also promotes investment in innovative, low-carbon technologies.

Energy utilities<sup>5</sup>, industrial emitters<sup>6</sup> and intra-EU aircraft operators are the main types of companies covered today.

Allowances are either auctioned or given to the emitters (known as free allocation). Historically, utilities have generally had to go through auction, while industrial emitters were largely given free allowances. More heavily emitting industrial companies may have to also go through auction to receive enough allowances to cover their activities. Aviation has had a separate track after its inclusion in 2012 and most of the allowances for this sector have historically been free allocation. Given the international nature of flights there is ongoing work to develop more global parameters here<sup>7</sup>.

## AN INCOMPLETE SYSTEM RIPE FOR FURTHER GROWTH

The current EU ETS only covers energy utilities, some industrial emitters and intra-EU flights. Based on Figure 1, despite covering two of the largest carbon emitting sectors, at best only half the EU-wide emissions are covered. We expect more sectors to come under the scope of the EU ETS. The latest round of legislative changes announced on 14th July 2021 have indicated some movement in this direction.

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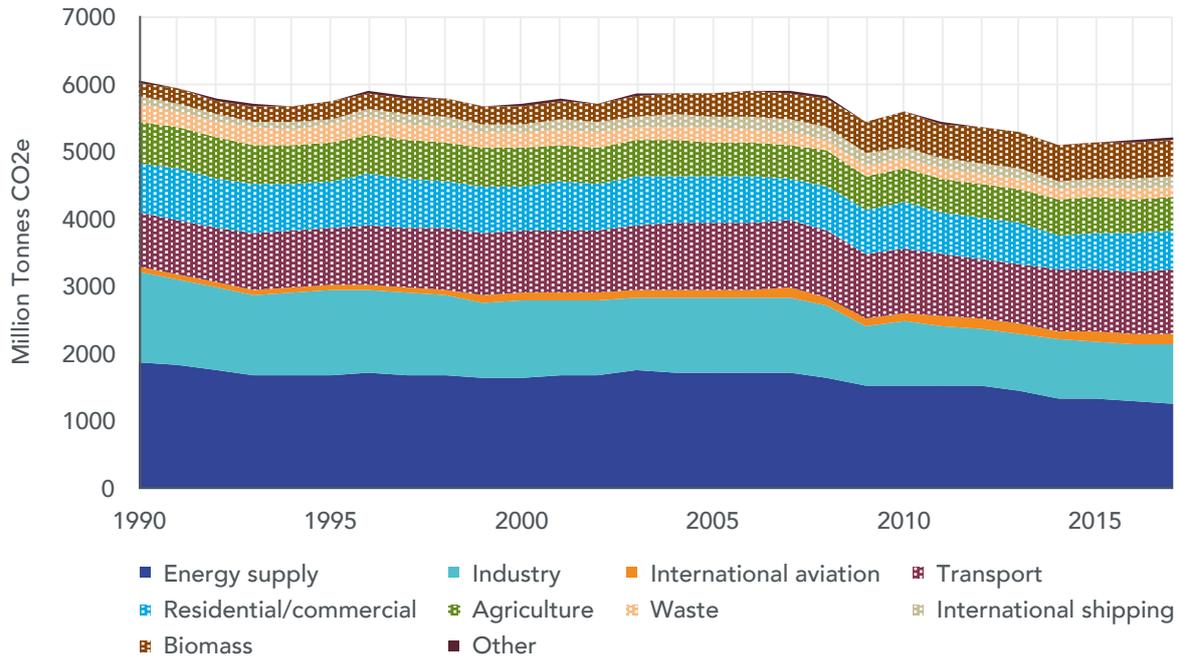
<sup>4</sup> Regulated entities must pay an excess emissions penalty of €100/tCO<sub>2</sub>e for each tonne of CO<sub>2</sub> emitted for which no allowances have been surrendered and buy and surrender the equivalent amount of allowances.

<sup>5</sup> Operating in electricity and heat generation

<sup>6</sup> Including oil refineries, steel works, and production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals.

<sup>7</sup> In October 2016, the International Civil Aviation Organization (ICAO) agreed on a Resolution for a global market-based measure to address CO<sub>2</sub> emissions from international aviation as of 2021. The European Commission adopted a series of legislative proposals in July 2021.

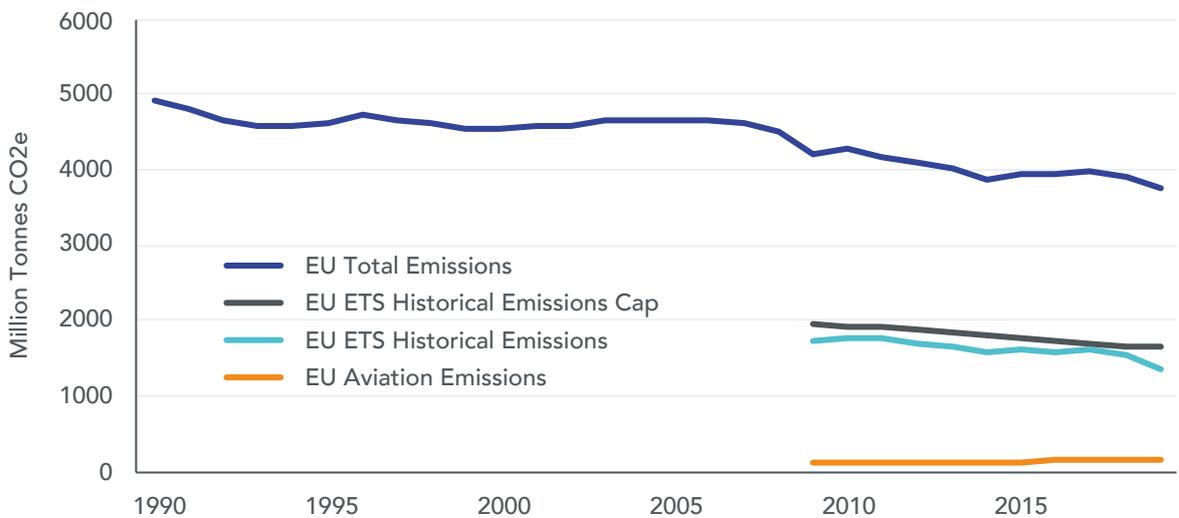
FIGURE 1: EU 28 GREENHOUSE GAS EMISSIONS BY SECTOR



Source: WisdomTree, European Environment Agency, 1990–2017 data. The purpose of this chart is to be illustrative. Not all installations in the energy supply, industry or international aviation sector are covered by the EU ETS. Furthermore, this chart is compiled at the EU 28 level. With the UK having left the system, the current programme applies to EU 27. **Historical performance is not an indication of future performance and any investments may go down in value.**

The EU ETS has been effective at keeping emissions in the covered sectors below the cap. However, as the cap doesn't cover all sectors, less progress in decarbonising has been made elsewhere (Figure 2). Most of the decline in aggregate emissions has come from covered sectors.

FIGURE 2: EU 27 TOTAL EMISSIONS AND ETS SECTOR EMISSIONS AND CAPS



Source: WisdomTree, European Environment Agency, 1990 – 2019 data. Available as of April 2021. Note data is at EU 27 level (removing the UK, which is no longer part of the system). **Historical performance is not an indication of future performance and any investments may go down in value.**

## THE ART OF CALIBRATING SUPPLY AND DEMAND

The EU ETS has gone through several phases of implementation (see [Box 2](#)) and it is currently in its fourth phase. Various correction mechanisms have been implemented to address the issue of oversupply which has haunted this market in early phases (see [Box 2](#) and [Box 3](#)).

These correction mechanisms, while complicating the system, are essential to address the oversupply and thus for the success of EU ETS market.

## PHASE 4 OF THE EU ETS PROGRAM

The EU has implemented into law a target to reduce greenhouse gas emissions by 55% by 2030 from 1990 levels and eliminate them by 2050<sup>8</sup>. The Commission estimates that in the absence of any changes, emissions would only decline by 40% by 2030 and 60% by 2050 (relative to 1990 levels). To achieve the EU's overall greenhouse gas emissions reduction target for 2030, the current sectors covered by the EU Emissions Trading System (EU ETS) must reduce their emissions by 61% compared to 2005 levels<sup>9</sup>. And more sectors need to be included.

The revised EU ETS Directive, which will apply for the period 2021-2030, will enable this through a mix of interlinked measures<sup>10</sup>:

- + Overall number of allowances will decrease at a faster rate than prior to 2021
- + The number of allowances put into reserve rather than in circulation will increase
- + Number of allowances in reserve will be limited to the auction volume of the previous year (allowances above that level will become void)
- + Free allocations will be phased out for some sectors
- + A carbon border tax will be implemented to reduce the risk of 'carbon leakage'
- + More sectors will be added to the system

The latest raft of measures announced in July 2021 to meet the urgent challenge to reduce emissions by 55% by 2030 are detailed in [Box 3](#), while some of the existing measures are in [Box 2](#).

## WHO ARE SPECULATORS AND WHAT IS THEIR ROLE IN THIS MARKET?

The underlying EUA market is designed for firms with a compliance obligation to meet on the emissions of their installations. Looking at the breakdown of who owns allowances in circulation (based on 2020 data), it is overwhelmingly energy utility companies and industry. But there is a presence of 'speculators'. Speculators either invest in EUAs as they expect the price to rise or are buying EUAs to restrict supply and help tighten the market (as they won't need to surrender them to meet compliance obligations). Based on the mechanics of the Market Stability Reserve (see [Box 2](#) and [Box 3](#)), unused allowances can reduce auction volumes and thus further tighten the market.

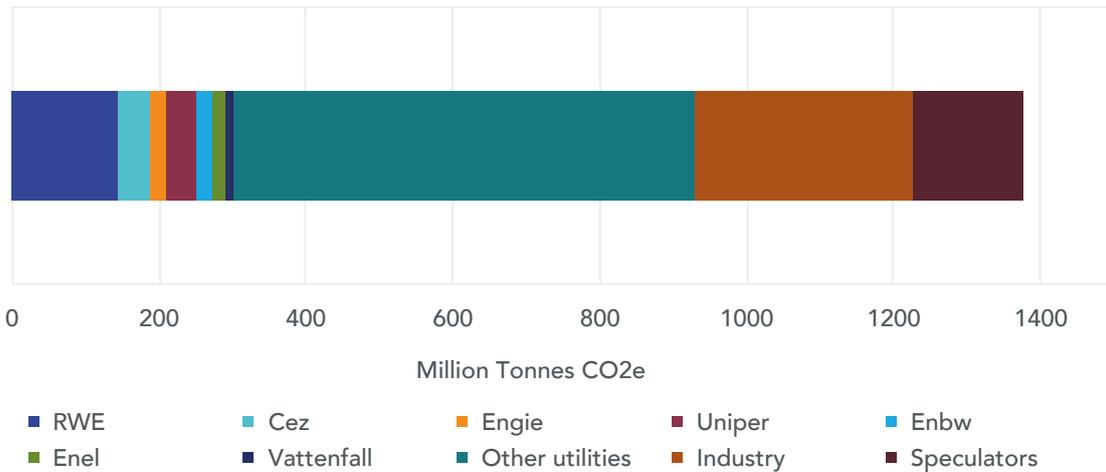
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<sup>8</sup> This is applied to all EU emissions

<sup>9</sup> This is applied to the sectors and companies covered in the current EU ETS system. Note reference date is 2005 (i.e. start of EU ETS programme, rather than 1990) [https://ec.europa.eu/info/sites/default/files/revision-eu-ets\\_with-annex\\_en\\_0.pdf](https://ec.europa.eu/info/sites/default/files/revision-eu-ets_with-annex_en_0.pdf)

<sup>10</sup> Some of these measures were in place before July 2021, while others were announced in July 2021 and are yet to be implemented. See [Box 2](#) and [3](#), [https://ec.europa.eu/clima/policies/ets/revision\\_en](https://ec.europa.eu/clima/policies/ets/revision_en)

FIGURE 3: HEDGED HOLDINGS OF EUAS IN 2020



Source: WisdomTree, BloombergNEF, company reports. REW, Cez, Engie, Uniper, Enbw, Enel, Vattenfall are all large energy utilities. Other utilities are energy utilities excluding those separately listed. Industry includes companies in the following covered sectors; oil refineries, steel works, and production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals. **Historical performance is not an indication of future performance and any investments may go down in value.**

There is an active futures market based on these EUAs, that can be used for hedging purposes for these firms with a compliance obligation or futures can be used by investors to express their views on price. As highlighted above, speculative activity can remove some of the underlying EUAs from inventory in circulation. So, speculators in the underlying can help tighten the market to a degree. EUA futures are a deliverable futures market<sup>11</sup>, so investors holding contracts to maturity (and have a registry account<sup>12</sup>) can take delivery and remove the allowances from circulation. We suspect more investors are likely to roll their contracts before expiry, and therefore the inventory of older contracts can come back into the market (even though inventory of the newer contracts are rolled into). We believe, as with most futures markets, the presence of speculators helps to enhance liquidity and aid the price discovery process i.e. help prices reach the 'correct' level. For a market that has arguably been under-priced for a large part of its history, an improved price discovery process is a welcome development. The cost of an under-priced carbon market would be the overproduction of carbon and hence futures market speculators play a vital role in this market.

The liquidity of EUA futures is concentrated in the first December contract (Figure 4b). There is markedly lower liquidity in the second December contract and very little liquidity in most other months. EUA futures have historically been in contango<sup>13</sup> (Figure 4a). But between the two most liquid contracts there is not a large negative roll yield. As EUA prices rise, we typically see parallel shifts in the curve.

<sup>11</sup> i.e. if contract is held to maturity, a long investor will receive underlying EUAs

<sup>12</sup> To receive the underlying a holder requires a registry account: [https://ec.europa.eu/clima/policies/ets/registry\\_en](https://ec.europa.eu/clima/policies/ets/registry_en)

<sup>13</sup> For definitions on contango, backwardation, and relevance to commodity investing, please see [Commodity ETPs Are Exposed To Futures Contracts Not The Physical Spot. Why Does It Matter?](#), May 2020

FIGURE 4A: EUA FUTURES PRICE CURVE

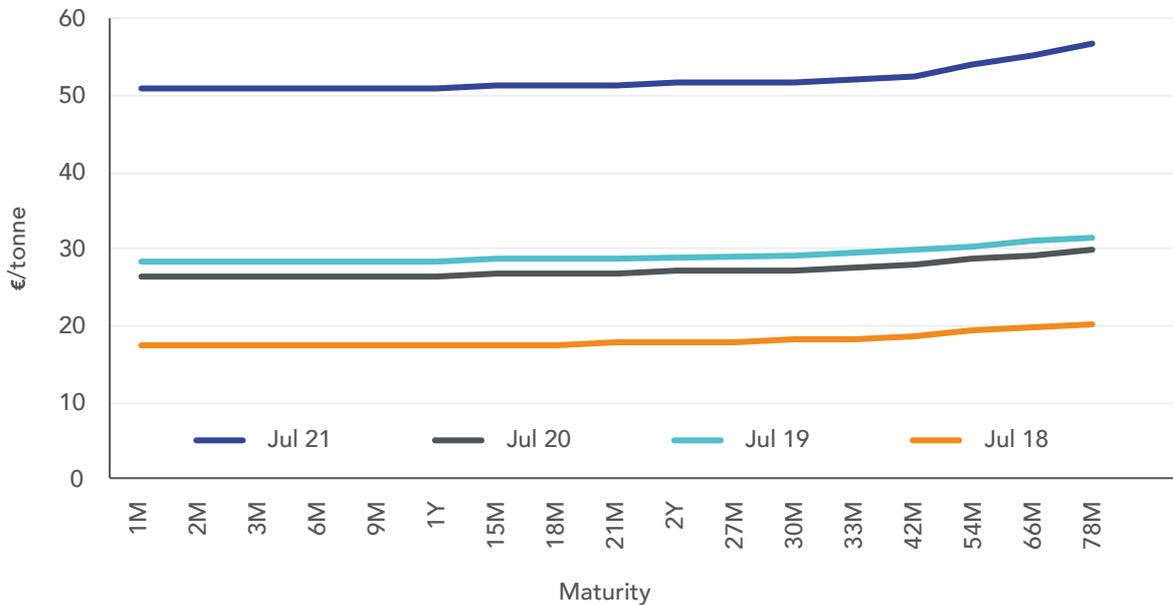
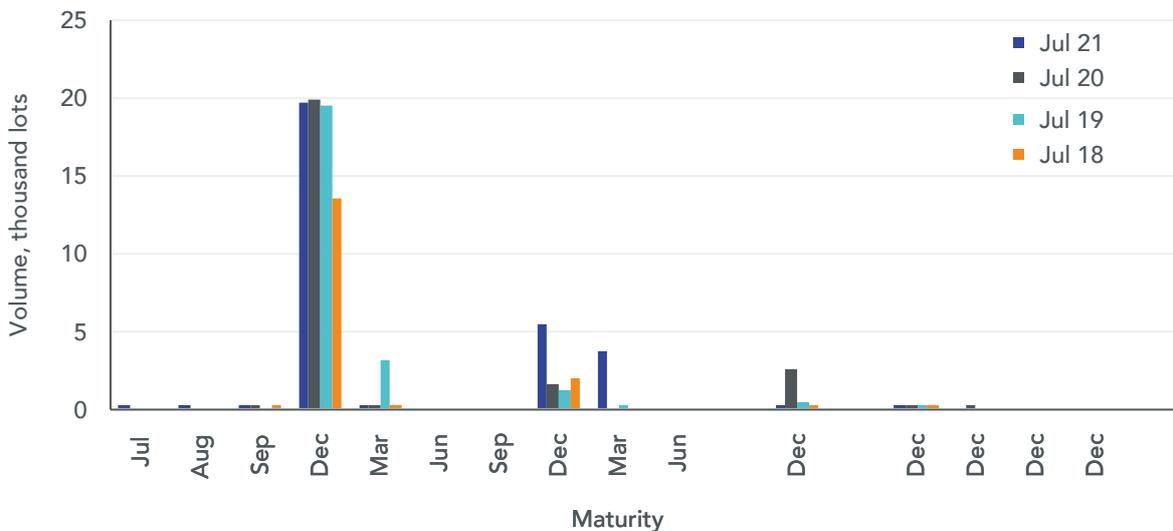


FIGURE 4B: EUA FUTURES VOLUMES



Source: WisdomTree, Bloomberg, ICE (Intercontinental Exchange) Index, Futures curves taken from final week of July for each respective year. **Historical performance is not an indication of future performance and any investments may go down in value.**

**WHAT ROLE CAN INVESTORS IN A CARBON EXCHANGE TRADED PRODUCT (ETP) PLAY?**

A carbon ETP can track a rolling futures exposure through a swap. The swap counterparty will hedge itself by buying futures. So, everything that applies to the role of a futures investor should also to the ETP investor. The key aspect being that they assist in the price discovery process.

# BOX 1: CARBON CAP AND TRADE AND ALTERNATIVES

Below we describe Greenhouse gas (GHG) reduction mechanisms where some form of 'price' is involved. There are other, more draconian methods of GHG reduction where regulators set a quantity of emissions and compliance criteria, but that is not the focus of this section.

## CAP AND TRADE

The origins of carbon pricing and more specifically the 'cap and trade' system can be traced to an academic essay published by John Dales in 1968. What is now considered to be a centrepiece of modern carbon policy rests on the idea that if policymakers decide on the appropriate level of greenhouse gas emissions acceptable, then a market-based system to trade carbon allowances or permits ensures emissions are cut where it costs least to do so. A robust carbon price also promotes investment in innovative, low-carbon technologies.

1. Policy makers decide on a cap on emissions.
2. Greenhouse gas (GHG) emitters must acquire allowances to emit a certain unit of GHG. These can be given to them, or they can be sold to them, depending on the design of the system. The key thing is that the quantity of permits must be limited and linked to the cap set.
3. GHG emitters can then trade their allowances. If the cost to reduce GHG emissions for a company (e.g. by using newer technology) costs less than the market price for the allowances, they have a strong incentive to sell their permits and reduce their emissions levels. If the cost to reduce GHG emissions for a company is higher than the market price for carbon allowances, and the company does not have enough allowances already to cover their GHG emissions, they are likely to buy allowances from those selling.
4. At the end of a compliance period, the GHG emitter needs to verify how much GHG they produced and surrender the appropriate number of allowances.

The specific design of the system can vary across several dimensions:

- + How allowances initially distributed
- + Sectors that are covered
- + Greenhouse gases that are covered Free allocations will be phased out for some sectors
- + Whether companies can 'bank' allowances for later use
- + How policymakers intervene in the market to align the carbon price with their policy ambitions

Cap and trade is not the only tool that policymakers can use to combat greenhouse gas emissions.

## CARBON TAX

A tax on GHG emissions can act as a deterrent to produce GHGs.

In contrast to a cap and trade system, the policy maker must decide on a tax level i.e. the price on carbon, rather than let the market decide. One of the advantages of a tax is the price of carbon is known and not volatile, while in a market-based system the price will fluctuate. While this system is simpler, it lacks the market mechanisms that efficiently redistributes the burden of cutting emissions to the companies that face the lowest costs in cutting.

## BASELINE-AND-CREDIT MECHANISMS

Also known as offset markets, these have some market-related characteristics. Emitters of GHGs are rewarded for cutting emissions (or investing in sustainable projects) through carbon credits. Emitters reducing emissions below a baseline receive credits while those who produce more than their baseline can buy credits. Put another way, companies can buy carbon credits generated by projects that are cleaning up our atmosphere, to compensate for the emissions they haven't yet eliminated. Reducing, emissions can therefore be monetised. In practice, this is administratively more complex than cap and trade as the policy maker has to determine a baseline for each sector or firm. Most schemes available today are voluntary and it is a very fragmented market.

# BOX 2: A BRIEF HISTORY OF THE EU ETS

The origins of the EU ETS trace to a green paper produced in 2000 by the European Commission to address the legally-binding GHG reduction targets agreed in the Kyoto Protocol to the UN Framework Convention for Climate Change in 1997. By 2003 a directive was drafted and in 2005 the EU ETS was operational. But as with any experimental system, getting the programme calibrated correctly has taken many years. There have been redrafts of the directive to broaden the scope and tighten what has habitually been an oversupplied market. And we expect the program to continually evolve.

## PHASE 1: 2005 – 2007: THE PILOT PHASE

This phase was designed to test price formation and establish the necessary infrastructure ahead of the 2008 deadline that EU member states had to meet their Kyoto commitments. In this phase most carbon emitters received their allowances for free. An oversupply of allowances saw the carbon price fall close to zero.

## PHASE 2: 2008 – 2012: FIRST COMMITMENT PHASE FOR KYOTO MARRED BY A FINANCIAL CRISIS

Responding to the oversupply in carbon allowances in phase 1, the European commission sought to tighten the market by reducing the amount of free allocation volumes. However, the fact the program accepted credits from a parallel global Clean Development Mechanism (CDM), meant it was an uphill struggle. Furthermore, the Global Financial Crisis that started in 2008 and the European Sovereign Debt Crisis of 2011 punctured economic activity and therefore the activity of carbon emitters. Oversupply remained an issue. Towards the end of this phase, intra-EU aviation became part of the system. Although the method of awarding allowances differ to the rest of the market. Therefore, policy documents and data often distinguish between 'Stationary installations' and 'Aviation installations'.

## PHASE 3: 2013 – 2020: HARMONISATION PHASE

The focus of this phase was to harmonise the scheme across the EU and put into place more aggressive mechanisms to tighten supply.

According to the European commission, the system started this phase with a surplus of 2 billion allowances. A number of measures were implemented to address this oversupply and by 2015 the oversupply was reduced to 1.78 billion allowances<sup>14</sup>.

- 1. A sliding cap.** A cap on emissions for the EU as a whole was set. A union-wide cap for stationary installations decreased each year by a linear reduction factor of 1.74%.
- 2. Back loading of auctions.** Instead of auctioning all allowances as originally intended, 900 million allowances were postponed to 2019-2020. This was viewed as a short-term measure to help prices in the initial few years of the phase, but aggregate allowances would be unaltered due to this measure alone.

<sup>14</sup> [https://ec.europa.eu/clima/policies/ets/reform\\_en](https://ec.europa.eu/clima/policies/ets/reform_en)

- 3. Market Stability Reserve (MSR).** Unallocated allowances are transferred to this reserve. A proportion of the allowances in circulation were routinely placed into this reserve<sup>15</sup>. It was decided that the 900 million allowances that were postponed from auction (in the backloading exercise) should go into this reserve rather than be auctioned in 2019 to 2020. Furthermore, in the 2019 to 2023 period, the percentage of total number of allowances in circulation determining the number of allowances put in the reserve would be doubled from 12% to 24%. Note aviation fell outside of the scope for MSR.

#### PHASE 4: 2021 – 2030: BECOMING PARIS-ALIGNED

The Paris Agreement, reached in 2015, sets out a global framework to avoid dangerous climate change by limiting global warming to well below 2°C and pursuing efforts to limit it to 1.5°C. The European Commission has decided the EU ETS will be one of the main tools to help the region decarbonise. The EU initially pledged to reduce GHG emissions by at least 40% by 2030 compared to 1990. All key EU legislation for implementing this target was adopted by the end of 2018. But that has recently been upgraded. A European Green Deal to further cut emissions by at least 55% by 2030 compared to 1990 has been enshrined into law. By 2050 Europe aims to become the world's first climate-neutral continent. On 14 July 2021, the European Commission adopted a series of legislative proposals setting out how it intends to achieve climate neutrality in the EU by 2050, including the intermediate target of an at least 55% net reduction in greenhouse gas emissions by 2030. This includes a raft of measures to strengthen the EU ETS (more in Box 3).

Prior to July 2021 reform, the following changes were already in place in phase 4:

- 1. More aggressive reduction rate.** The cap on emissions continues to decrease annually at an increased annual linear reduction factor of 2.2% (compared to 1.74% before)
- 2. More allowances put in reserves.** Between 2019 and 2023, the amount of allowances put in the reserve will double to 24% of the allowances in circulation. The intention was to restore the regular feed rate of 12% in 2024.
- 3. Cancelling allowances in reserve so that they don't re-enter market.** From 2023 onwards the number of allowances held in the reserve will be limited to the auction volume of the previous year. Allowances above that level become void, thus restricting supply further.
- 4. Restricting free allowances.** For some sectors covered by the programme, free allocations will remain to reduce the risk of those industries leaving the EU to jurisdictions with less stringent carbon policies (i.e. carbon leakage). But for other sectors free allocations will be phased out after 2026 from a maximum of 30% to 0% at the end of phase 4.
- 5. Promoting clean technology.** Various innovation and modernisation funds have been set up. They are expected reduce the demand for newly issued allowances in auction and thus accelerate the pace at which the reserve declines (linked to point 3 above).

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<sup>15</sup> Each year, the Commission publishes by 15 May the total number of allowances in circulation. Subject to some minimum criteria, 12% of the allowances in circulation were put into reserve.

# BOX 3: THE ETS OF THE FUTURE – FIT FOR 55

In line with the European Green Deal, to achieve carbon neutrality by 2050 and have tangible legal limits on carbon at 55% below 1990 levels by 2030, the following changes will come in play after new legislation was announced on 14 July 2021:

1. The EU will create a carbon border adjustment mechanism (CBAM) to impose a CO<sub>2</sub> tariff on imports. It will be the first of its kind in the world and initially focus on cement, iron and steel, aluminium and fertilizers. That will allow the European Commission to reduce free allowances to those sectors without the fear carbon leakage.
2. The linear reduction factor will likely increase from current 2.2% in 2023-2024.
3. The EU ETS will expand to shipping, buildings and road transportation. Shipping will receive a cap in 2026 with a phase-in period between 2023-2025. The scheme for buildings and transport would be set-up from 2025.
4. The MSR feed rate will remain at 24% beyond 2023. Aviation allowances will also fall into scope of the MSR. The Commission also wants to cap the MSR to 400 million allowances.

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