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Investment Research

Introduction to the European carbon market

Understanding commodities

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- Imposing a cost on carbon is a valuable instrument to reduce emissions toward zero and promote investment in low-carbon technologies.
- Developing carbon markets have therefore become an increasing focus for governments to curb greenhouse gas emissions and combat climate change.
- This education note dives into the world's most mature carbon market—the European Union Emissions Trading System. We also share guidance for investors with a high risk tolerance who seek exposure to this emerging segment.

Source: Gettyimages

Our view

The shift to ESG (environmental, sustainable, governance) and sustainable finance is quickly gaining traction. Today, ESG considerations are playing a larger role in the investment and corporate strategies of investors, managers, and issuers across the financial spectrum.

According to international agencies, to avoid the most catastrophic consequences of climate change, the world must halve existing greenhouse gas emissions by 2030 and achieve net-zero emissions by 2050. Putting a price on carbon identifies and shifts the cost of abatement to those who are responsible for emissions. While reductions should ideally come from absolute cuts, carbon markets help to incentivize businesses to reduce emissions. They therefore act as a vital mechanism in reaching net-zero targets and encouraging sufficient investment to transition to new, low-emission operating models.

Different systems are used globally to arrive at a carbon price. The two main mechanisms are a carbon tax and a market-based system (such as emissions trading). In this education note, we focus on the European Union (EU) Emissions Trading System (ETS)—the world's biggest and most heavily traded market-based system. The European Commission's first attempt to establish a carbon market failed to gather traction during the early stages in 2005. But recent efforts and forthcoming reforms are improving the market's transparency and efficiency and reducing regulatory uncertainty.

Carbon prices are on the rise as a result, and investors are growing more interested in this segment. Many market participants equate the need to meet net-zero targets with a much higher carbon price. While the demand to cut emissions is a key driver, there are other factors to consider and forecasting prices is a challenging task. We do expect prices to stay supported over the coming years, but investors who want to engage in the emissions market need to be aware of possible short-term price setbacks and high volatility.

Delivering on emissions reductions

In 2015, 196 nations signed an international treaty—the so-called Paris Agreement—to limit global warming to well below 2, preferably 1.5, degrees Celsius compared to pre-industrial levels. While not necessarily a definitive target, 2 degrees is the threshold scientists deemed necessary to avoid the most severe consequences of climate change.

Climate change is defined by the International Panel on Climate Change (IPCC) and others as the long-term alteration of temperatures and typical weather patterns in a place. The key cause is greenhouse gases, like carbon dioxide and methane, in the atmosphere that trap heat. The scientific consensus is clear that because of the vast amount of greenhouse gases produced by modern human activity, climate change is accelerating. Climate change is associated with increasingly frequent and intense natural disasters, ranging from droughts and wildfires to hurricanes and coastal flooding from rising sea levels. Rapid warming could therefore greatly affect our communities and ways of life.

The challenge of reining in climate change is taking on increasing urgency. To avoid the worst-case scenario, climate scientists argue that emission reductions must be rapid and deep. The goal is to bring down emissions globally to net zero by 2050 or sooner. In the lead up to the 26th UN Climate Change Conference of the Parties (COP26) in Glasgow (31 October to 12 November 2021), a growing number of governments and corporations have set net-zero commitments and implemented decarbonization action plans.

Importantly, to meet these aspirations, the transformation will need to accelerate. Here, the carbon market provides an integral solution to reduce emissions and support the development of emission-saving technologies. In response to these announcements and stronger economic growth, carbon prices have been on the rise. For example, EU ETS carbon prices have reached an all-time high of more than EUR 56.6 per metric ton of carbon dioxide equivalents this year. Current prices are more than double what they were at the start of 2020 (EUR 24.28) and 2019 (EUR 25.06).

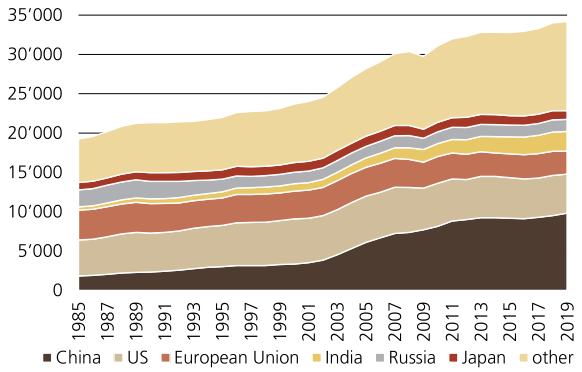
Challenges in emissions reduction

Climate change and climate policies impact everyone. Meeting these targets requires fundamental changes across all sectors of the economy. Three quarters of emissions come from transport, heating and cooling of buildings, manufacturing goods, production of electricity, and agriculture. Reducing emissions to net zero will require an enormous investment into developing new, low-carbon technologies in power, transport, and industry.

History also shows that scaling up supplies of any energy resource can take decades, meaning that we need to begin the process now. Since the Industrial Revolution, the most affordable and reliable energy resources have been fossil fuels. Demand for these fuels has risen year after year over the past several decades, and emissions of carbon dioxide (CO_2) and other harmful gasses have increased substantially.

Carbon dioxide emissions keep rising

Values are in million tons of carbon dioxide



Source: BP Statistical Review of World Energy 2020, UBS

The latest data from BP shows that China accounted for 28.8% of global CO_2 emissions in 2019, followed by the US (14.5%), the European Union (8.6%), India (7.3%), Russia (4.5%), and Japan (3.3%). These six countries/regions are responsible for around two thirds of all carbon dioxide emissions worldwide. Worth noting is that some countries' carbon footprints are overestimated/underestimated if they export/import carbon-intensive goods like plastic, chemicals, and fossil fuels.

Balancing environmental costs with the reality of meeting the needs associated with urbanization and industrialization requires long-term planning. This applies not only to energy production and transition, but also to innovative and supportive city, state, and national programs and policies. This includes a regulatory framework that effectively imposes a price/cost on CO_2, which should encourage more complete alignment of environmental and financial costs.

Many discussions under the topic of ESG are focused on equities and bonds. But with carbon markets, even commodities have their own ESG instrument. In principle, investors concerned about the environmental impact of the production and consumption of commodities can offset the emissions via the carbon market (although commodity futures are financial instruments and do not generate emissions).

What is carbon pricing?

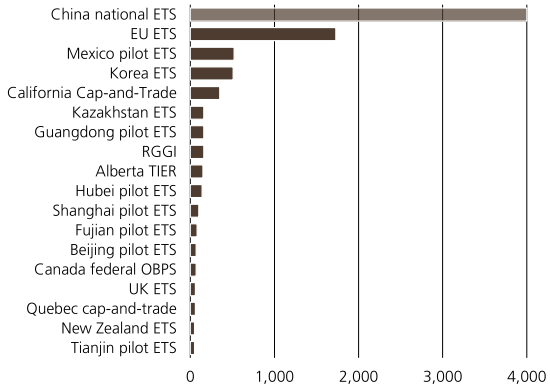
According to the World Bank, 46 countries—covering over 20% of global greenhouse gas emissions—already have a price on CO_2 emissions. In an ideal world, these countries would have integrated and connected mechanisms, but this

is not the case at present, with different pricing, liquidity, and credit mechanisms being in place.

Putting a price on carbon is crucial to shift the burden of abatement to those who are the largest emitters. Instead of dictating who should cut and how, a carbon price gives a financial signal to align business and environmental interests, such that the decision on where and how to adjust polluting activity and resulting emissions is made by business owners who understand their own operations best. The carbon price also stimulates clean technology and market innovation, fueling new, low-carbon drivers of economic growth.

Existing emissions trading systems

Covered emissions in metric tons of carbon dioxide equivalents



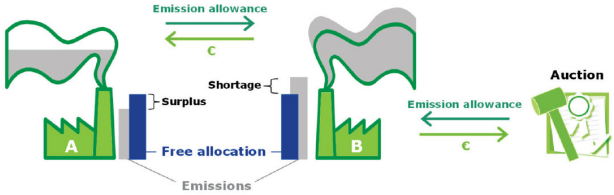
Source: World Bank, UBS, Note: China's national ETS is scheduled to start at the end of June, RGGI = Regional Greenhouse Gas Initiative (US)

Two main types of carbon pricing

There are two main mechanisms in setting the price of carbon: a market-based system (emissions trading) and a carbon tax. The first uses a cap-and-trade approach. The cap corresponds to the total amount of emissions allowed under the mechanism. Over time, the cap is reduced so that total emissions drop. Companies are required to have allowances equivalent to their emissions. Companies can buy emission permits (carbon allowances) via auctions or receive free emissions allowances based on specific industry benchmarks. After each year, companies must surrender enough allowances to cover their emissions, otherwise they are fined. Companies, as well as financial investors, can trade those allowances on the secondary market. If a company reduces its emissions, it can keep the spare allowances to cover its future needs or can sell them to another company that is short of allowances.

A company which faces a very high cost in reducing its emissions may opt to buy additional allowances, while a company with low emissions reduction costs may choose to reduce its emissions by more than its allowances and sell the leftover allowances. The market-based system ensures emissions are cut where it costs least to do so. In contrast, a carbon tax sets a direct price on carbon (i.e., companies are taxed based on their emissions), with the aim to incentivize companies to reduce their emissions.

How a market-based system (emission trading) works



Source: European Commission EU ETS Handbook https://ec.europa.eu/clima/sites/clima/files/docs/ets_handbook_en.pdf

Market-based systems tend to come with higher volatility, which is something undesired by companies and consumers, while the tax-based system is more predictable for companies. The market-based system guarantees a defined reduction in emissions, but at uncertain costs for companies. The tax system has well-known costs for companies, but no certainty on how much emissions are being reduced. A market-based system promotes energy efficiency and rewards companies that are more efficient in curbing emissions. To achieve the net-zero target, a carbon tax would have to be increased over time, while an emissions trading system would need to reduce the number of allowances over time.

Finding the optimal carbon price

To have an impact on emissions, the price of carbon needs to be high enough to change the behavior of companies and incentivize them to reduce emissions but low enough to ensure companies remain competitive internationally. If the carbon price is below the cost of reducing emissions, companies will pay the carbon tax or buy additional emission allowances.

A perfect carbon market would cover all greenhouse gas emissions and consider goods produced abroad and imported to prevent circumventions and any cost arbitrage. A strong political will is also needed to pursue those targets, to ensure that rising costs and economic concerns do not dilute those targets over time.

Let's now dive into the EU ETS.

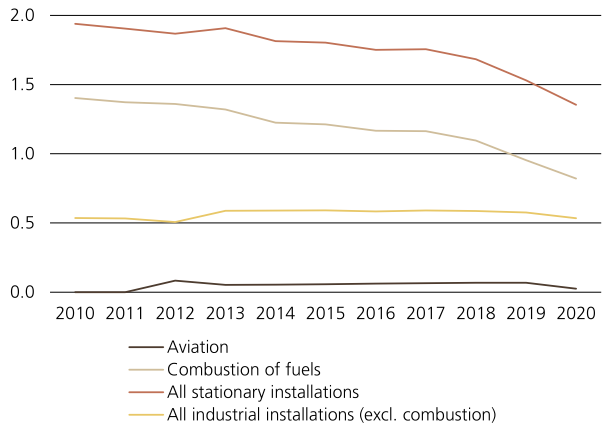
The European Union Emissions Trading System

The ETS, established in 2005, was one of the first major carbon emissions markets and is still the largest in terms of turnover and market capitalization. The ETS coverage is equivalent to less than 5% of global emissions, although the World Bank estimates it represents about 20% of emissions covered by all current carbon pricing initiatives in operation. Greenhouse gases covered include carbon dioxide, nitrous oxide from production of nitric, adipic and glyoxylic acids, and glyoxal and perfluorocarbons from production of aluminum. Gases such as methane or hydrofluorocarbons are not covered by the ETS and are subject to member states' emissions targets.

The ETS is a cap-and-trade system. There is a cap on how much greenhouse gases companies can emit collectively every year. One emission allowance (EUA) gives the holder the right to emit one metric ton of carbon dioxide or the equivalent amount of nitrous oxide and perfluorocarbons. Companies can buy emission permits (carbon allowances) via auctions or receive free emissions allowances based on specific industry benchmarks. If polluting companies manage to reduce emissions, they can either keep the unused allowances and surrender them in a future compliance year or sell them. In contrast, if a company produces too much emissions, they will have to buy extra allowances either via the auction mechanisms or on the secondary market. The emission cap decreases every year, ensuring that total emissions fall.

Emissions by sector within the European Economic Area

Values are in billion tons of CO2 equivalent



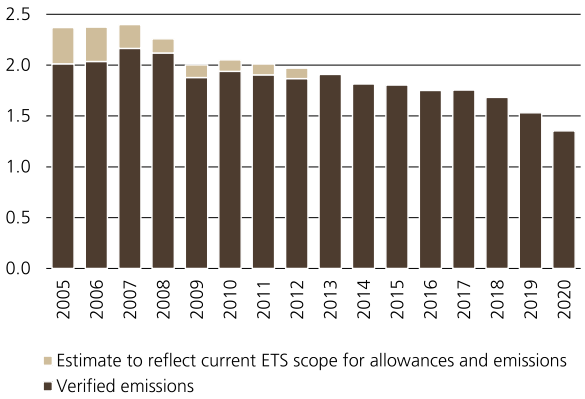
Source: European Environment Agency, UBS

The ETS operates in all member countries of the European Union, as well as Iceland, Liechtenstein, and Norway, and focuses on sectors where emissions can easily be measured, reported, and verified. At present, the ETS includes around 10,000 installations (also referred to below as companies) in the power sector (electricity and heat generation), energy-intensive industries (oil refineries, steel works, and production of iron, aluminum, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids, and bulk organic chemicals), and flights between participating countries.

The ETS covers around 40% of the European Union's greenhouse gas emissions. Participation in the EU ETS is mandatory for companies in the above-mentioned sectors, but smaller companies can be excluded in some of these sectors. Emissions from companies covered by the ETS fell by around 35% between 2005 and 2019. The current target is to reduce the carbon dioxide emissions by 43% by 2030 from 2005 levels; these targets might be raised as part of the European Green Deal.

Historical emissions

Values are in billion tons of CO2 equivalent



Source: European Environment Agency, UBS

ETS and its history

The ETS has evolved over the years, gradually becoming more restrictive. It is currently in Phase four (2021 to 2030) of its development. Phase one (2005 to 2007) laid the foundations of the emissions trading system as essentially a trial period, when the necessary legal and regulatory frameworks were set. During the starting phase, companies received almost all allowances freely, with carbon prices as a result briefly falling to zero.

During the second phase (2008 to 2012), the number of free allowances was reduced, and member states started to auction up to 10% of their allowances. The ETS also expanded to include Iceland, Liechtenstein, and Norway. From 2012, flights within the European Economic Area were included. Nitrous oxide was added to the list of covered greenhouse gases, while companies were allowed to keep emission allowances for subsequent years. The market remained oversupplied and low prices prevailed, with the Global Financial Crisis and the European Debt Crisis weighing on economic growth and significantly reducing emissions.

Phase three started in 2013 and lasted until 2020, with the regulator taking further actions to tighten the market to address oversupply issues. Perfluorocarbons were added to the list of covered greenhouse gases. The share of auctioned allowances rose above 50%, although member states with a below-average GDP per capita were granted exemptions via free allowances to support their electricity sectors. During this phase, the number of available allowances was reduced every year by 1.74% to about 38.2 million allowances.

The Market Stability Reserve started operating in 2019. Its purpose is to take excess allowances out of circulation if the total number of allowances in circulation exceeds a specific level (currently 883mn allowances) or to add allowances if the total number of allowances in circulation drops below a specific level (currently 400mn allowances). Under the current phase four, the annual reduction has increased to 2.2% per year to about 43mn allowances.

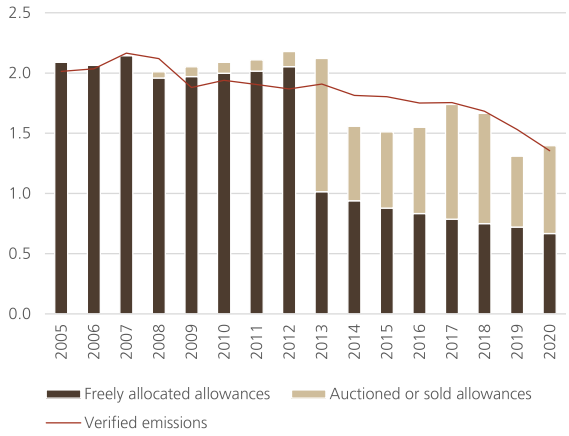
ETS and how it works

Every year, by 31 March, companies have to report their emissions during the previous calendar year. Companies have a month (30 April) to surrender allowances for all their emissions of the previous year. Any surplus or shortfall is resolved via trading on the secondary market. Once surrendered, the allowances are then cancelled. Failure to deliver allowances by 30 April results in a fine of EUR 100 per excess ton of emissions. The fine does not liberate emitters from the obligation to surrender allowances. The ETS allows covered companies to store their unused allowances each year.

- **Allocation of allowances:**
  The EU hands out a certain number of allowances for free and sells the remaining allowances via an auction. Auctioning is the default method of allocating allowances. Currently, 57% of all allowances are auctioned. Free allocations are granted to companies with a high risk of carbon leakage. This aims to ensure that goods are not produced abroad in countries with lower emission targets or that products are not replaced by more carbon-intensive imports. The credits from free allowances have no expiry date and hence can be kept for the future.
  Those free allowances are granted based on specific industry benchmark (average emissions of the first decile of the most efficient installations), historical activity level of each installation, and a coefficient measuring the risk of carbon leakage. The system seeks to incentivize carbon efficiency by giving more credits to the best performers and less credits to the worst performers. It also supports the carbon market, as entities without sufficient free allowances must purchase credits in the primary auctions or the secondary market or must reduce their emissions.

Allowances and emissions

Values are in billion tons of CO2 equivalent



Source: European Environment Agency, UBS

- **Allowances by sector:** Electricity generators must secure (nearly) all their allowances via the auction process (some free allowances are granted to member states with a low GDP per capita). In the industrial sector, 70% of the allowances are auctioned. Here, the aim is to reach 100% by 2027. In the aviation sector, only 15% of the allowances are auctioned.

- **Auction platform:** The common auction platform is the European Energy Exchange (EEX) in Leipzig, where auctions take place several times a week. Germany and Poland have opted out of the common auctioning platform. Germany has nominated EEX as its opt-out platform, while Poland is making use of the common auction platform (EEX) to auction its allowances until further notice.

- **Use of auction revenues:**
  Since the beginning, around EUR 70 billion has been collected via auctions, including around EUR 19 billion in 2020 alone. Revenues of these auctions go to participating countries, and at least half of the revenues must be used for climate- and energy-related purposes. Member states must report to the European Commission about how they use their revenues but are free to choose how to invest the funds.
  In 2019, member states spent close to 80% of their revenues on domestic and international climate-related investments. The EU also retains a part of the revenues to finance two funds for innovation and modernization: The first fund focuses on supporting innovation in energy-intensive industries, renewable energy, energy storage, and carbon capture, use, and storage. The second fund is designed to help ten low-income EU member states (Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovakia) to reduce the climate impact of their

energy systems by funding modernization projects and improve energy efficiency, including investments to support the social transition to a low-carbon economy (e.g., upskilling/reskilling of affected workers).

Total number of allowances in circulation in 2020

Supply		Demand	
a) Banking from phase 2	1'749'540'826	a) Tonnes of verified emissions from installations under the EU ETS between 1 January 2013 and 31 December 2019	12'193'929'203
b) Free allowances for the period between 1 January 2013 until 31 December 2019, including from NER	5'850'263'308		
c) Total number of allowances auctioned between 1 January 2013 and 31 December 2019, including early auctions	5'229'748'000	b) Allowances cancelled in accor- dance with article 12(4) of Directive 2003/87/EC by 31 December 2019	348'581
d) Allowances deducted from auctioning volumes during the period 2014–2016	900'000'000	Sum (demand)	12'194'277'784
e) Allowance deducted from auctioning volumes in 2019 following the Commission Communications of 15 May 2018 and 14 May 2019	397'124'722	**MSR holdings**	
		Number of allowances in the reserve	1'297'124'722
f) The number of allowances monetised by the European Investment Bank for the purposes of the NER300 programme	300'000'000	**Total number of allowances in circulation**	**1'385'496'166**
g) International credit entitlements exercised by installations in respect of emissions up to 31 December 2019	450'221'816		
Sum (supply)	14'876'898'672		

Source: European Commission https://ec.europa.eu/clima/sites/clima/files/ets/reform/docs/c_2020_2835_en.pdf

Price drivers

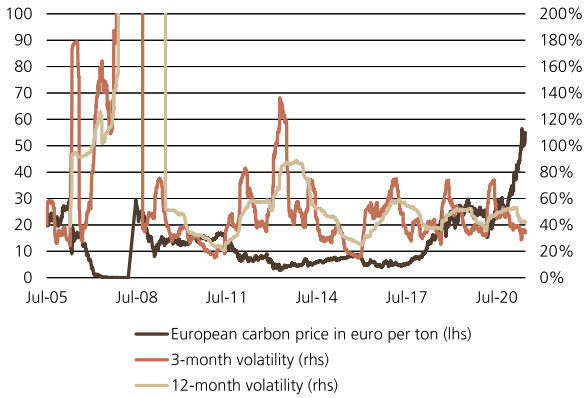
Like with other markets, supply and demand normally set the price of the underlying asset. But in contrast to commodity markets, the supply of carbon allowances is primarily driven by policy. Investors keen to invest in the ETS need to be familiar with the political system of the European Union and the market fundamentals that underline it.

The Commission of the EU is the body that proposes new legislation or amends existing rules. It then submits proposals to the European Parliament and the European Council (heads of state or government of the member states of the EU, the European Council president, and the president of the European Commission), both of which can propose further amendments. Both parliament (absolute majority) and council (qualified majority, 55% of its member representing at least 65% of the population) need to approve the proposals for them to become law.

- **Policy settings:**
  The European Commission is now working on a new round of reforms—i.e., the "Fit for 55" package, which aims to reduce carbon dioxide emissions by 55% by 2030 from 1990 levels versus 40% currently—to align the ETS with the targets of the European Green Deal. Options discussed include a faster annual drop of the emission cap (currently declines by 2.2% per year), the addition of new sectors (e.g., the maritime sector), further reducing the share of freely allocated allowances, and a carbon border adjustment mechanism whereby producers outside the ETS would pay a duty to cover the carbon emissions when sending goods into the ETS region.
  More clarity should emerge by mid-July. We think the reforms could result in a faster drop of newly issued allowances over the coming years, with less free allowances and, therefore, more allowances heading to auction. This outcome could be partially offset by companies making use of the free allowances they've hoarded. Also, potential changes could impact the Market Stability Reserve; for example, excess allowances taken out of circulation and allowances added at lower thresholds.

Volatility of European carbon prices

daily data



Source: Bloomberg, UBS

- **Investor activity:** While not a supply topic, regulators could limit the number of emission allowances financial investors can hold. Financial investors currently play a small role in the European carbon market. But a rising participation would improve liquidity and increase hedging opportunities for companies in the European carbon market. That said, it could also result in elevated price volatility in cases where investors make large shifts in their positions on changing economic or market fundamentals. Also, if rising investor demand caused prices to soar, this could raise concerns about the prospects of the polluting companies, which might result in political forces wanting to limit investors' holdings. Such an outcome could add downside pressure on prices.
- **Economic activity, seasonal factors, and technological change:** Recessions reduce emissions (as we saw during the recent one), while periods of robust growth come with higher emissions. Weather and relative energy prices matter, too. During winter, cold weather triggers higher heating and power demand; and warm summers tend to increase power demand for cooling purposes. Unfavorable weather conditions may also affect the use of renewable and hydro energy (e.g.,

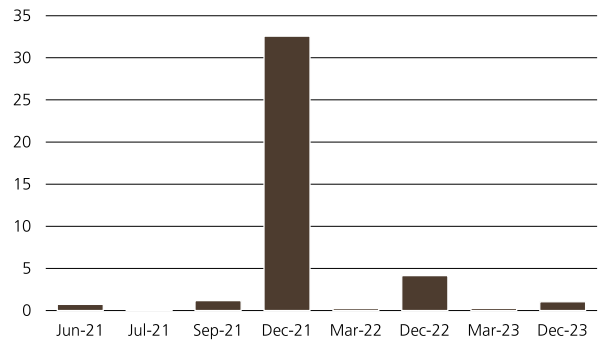
lack of sun and wind, low water levels in dams), causing power utilities to become more dependent on fossil fuels to produce electricity. Power generators may also switch between, for instance, coal and gas depending on relative prices. When power generators opt for coal, pollution increases and so does attendant demand for carbon allowances. The costs of technologies that reduce carbon emissions matter as well, as they can reduce the needed number of allowances over time.

Ways to access the carbon market

Emissions allowances are traded on the primary market (i.e., the place where allowances, created by the market authority, enter the system via auction or free allocation) and the secondary market (e.g., physical allowances traded via the spot market, derivates of allowances such as futures via exchanges). Market participants wanting to trade spot allowances must have an account at the registry of the EU, which is where the European Union tracks all owners of physical emission allowances. Spot trades are executed via the European Energy Exchange or over the counter. Futures of emission allowances can be traded on the European Energy Exchange, the Intercontinental Futures, or NASDAQ OMX Commodities Europe. Futures contracts have monthly, quarterly, or yearly expiries. Futures contracts with yearly expiries do so in December, coinciding with the end of the annual trading period, which is why December contracts are the most traded and liquid contracts; spot, monthly, and quarterly contracts are less liquid.

Traded volumes in futures contracts

Average from early May to 25 June 2021

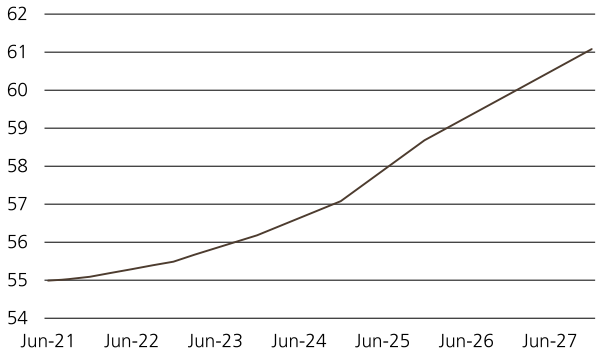


Source: Bloomberg, UBS

For investors, there are usually two reasons to trade emission allowances. First, by buying physical allowances, an investor removes the number of allowances available to participating companies who would have otherwise used such allowances to cover their emissions. By reducing the total number of allowances available in the system, companies need to make use of a smaller pool of allowances to cover their emissions. This can increase the price of the allowance and force participating companies to continue reducing emissions and/or invest in technologies that lower carbon emissions.

European carbon prices trade in contango (upward sloped)

EUA futures curve in euro per metric ton



Source: Bloomberg, UBS

The second reason is to pursue cash-and-carry arbitrage, though this strategy only works as long as the futures curve is upward sloped (in contango). With cash-and-carry arbitrage, the investor buys lower-priced physical allowances and sells more expensive futures contracts with an expiry that ranges from a few months to longer periods. At the future's expiry, the spot allowance is delivered. Investors can monetize the difference between the two positions. There are several possible explanations of why the futures curve may remain in contango. Companies incur costs to buy and hold allowances, so longer-dated contracts are more expensive than shorter-dated ones. Also, higher prices may reflect an expectation of higher prices in the future as a result of the ambitious climate policies to reduce emissions. That said, futures curves have historically offered poor guidance in predicting prices.

European carbon prices

EUA front-month futures prices in euro per metric ton

Source: Bloomberg, UBS

Outlook

Carbon prices have risen by almost by 70% since the start of this year, with European emission allowances trading around EUR 55 per ton. Price support is coming from solid economic growth in in Europe, which likely will result in higher emissions following the pandemic-triggered economic dip in 2020. Activity in the European steel, cement, and aluminum industries covered by the ETS is already back to 2019 levels; while improving, activity in refineries is still lagging 2019 levels. Greater economic activity also translates into more electricity demand.

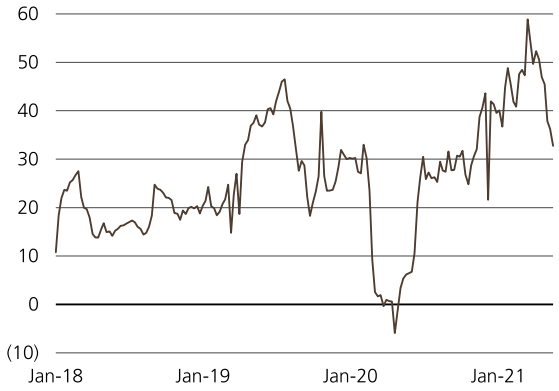
A recent academic study ("A near term to net zero alternative to the social cost of carbon for setting carbon prices") co-authored in 2020 by Noah Kaufman (a senior economist on the White House Council of Economic Advisers) estimated the net price of carbon required to achieve net zero carbon emissions in the US by 2050 to be USD 34–64 per metric ton in 2025 and USD 77–124 per metric ton in 2030. According to the authors, their price scenarios are very sensitive to assumptions about where fossil fuel prices will trade over the coming years, the pathway to net-zero (e.g., a straight line or sloped), changes in technologies, behavioral changes of individuals and polices, and the costs of carbon-lowering technologies.

Many market participants have indicated that higher carbon prices are needed over the coming years to provide sufficient economic incentives to curb emissions toward net-zero, but forecasting where prices will be in the next years remains a challenge considering all of the above-mentioned moving parts. Available carbon forecasts come with wide ranges and tend to be the result of different scenarios that make assumptions on policy reforms, economic growth, weather, and the relative prices of different underlyings such as fossil fuels. The positioning of financial investors has also increased in anticipations of reforms to the EU ETS and the ongoing broad focus on ESG by investors.

We expect prices to stay supported over the coming years, but investors who want to engage in the emissions market need to be aware of possible short-term price setbacks and elevated volatility.

Speculative positions for investment funds

Values are in thousand contracts



Source: Bloomberg, UBS

Appendix

Term / Abbreviation	Description / Definition	Term / Abbreviation	Description / Definition
Backwardation	When the spot price trades above the prices of futures	BCF	Billion cubic feet
BCM	Billion cubic meters	BCOM	Bloomberg Commodity Index
Bu	Bushel (1 ton = 36.7bu wheat/soybean; 39.37 bu corn	CBOT	Chicago Board of Trade
CFTC	Commodity Futures Trading Commission	CIF	Cost, insurance and freight
CME	Chicago Mercantile Exchange	CMCI	UBS Bloomberg Constant Maturity Commodity Index
CNIA	China Non-Ferrous Metals Industry Association	COMEX	New York Commodities Exchange
CONAB	Companhia Nacional de Abastecimento (Brazilian government agency)	Contango	When the spot price trades below the prices of futures
COT	Commitment of Traders	CRB Index	Index Commodities Research Bureau Index
Crush margin	Difference between the value of the oil and meal produced from the soybeans	CTA	Commodity Trading adviser
DOE	U.S. Department of Energy	EIA	Energy Information Administration
ETC	Exchange Traded Commodity	ETF	Exchange Traded Fund
Excess Return (ER)	Excess return = spot return + roll yield return (rolling of futures contracts)	FAO	Food and Agriculture Organisation
FOB	Free on Board	HH Natural Gas	Henry Hub Natural Gas
IEA	International Energy Agency	IAI	International Aluminium Institute
ICCO	International Cocoa Organisation	ICE	Intercontinental Exchange
ICO	International Coffee Organisation	ICSG	International Copper Study Group
IIZSG	International Lead and Zinc Study Group	IMF	International Monetary Fund
INSG	International Nickel Study Group	JM	Johnson Matthey
JODI	Joint Oil Data Initiative	KCBT	Kansas City Board of Trade
LME	London Metal Exchange	LNG	Liquefied Natural Gas
mbpd	Million barrels per day	Mtoe	Million tons oil equivalent
NOAA	National Oceanic and Atmospheric Administration	NYBOT	New York Board of Trade
NYMEX	New York Mercantile Exchange	OECD	Organisation for Economic Co-operation & Development
OPEC	Organization of Petroleum Exporting Countries	PGM	Platinum Group Metals
RICI	Rogers International Commodity Index	S&P GSCI	Standard and Poor's-Goldman Sachs Commodity Index
SHFE	Shanghai Futures Exchange	SI	Silver Institute
TC/RC	Treatment/Refining Charges	TCF	Trillion cubic feet
Thomson Reuters GFMS	Research consultancy specializing in precious metals, base metals and steel market research	TOCOM	Tokyo Commodity Exchange
Total Return (TR)	Total return = excess return + return from the cash collateral	USDA	US Department of Agriculture
UNICA	Sugar and Alcohol Millers Association of São Paulo state	USD/bbl	USD per barrel
USD/bu	US Dollar /bushel	USD/gl	USD per gallon
USD/lb	USD per pound	USD/mmbtu	USD per 1 million British thermal unit
USD/mt	USD per metric ton	USD/oz	USD per oz, (1 oz = 31.10 grams)
USGS	U.S. Geological Survey	WBMS	World Bureau of Metal Statistics
WGC	World Gold Council	WPIC	World Platinum Investment Council
WTI Crude Oil	West Texas Intermediate Crude Oil	WTO	World Trade Organisation

Appendix

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