

Global Carbon Market Outlook 2024

Trends diverge, prices converge

2024

Executive summary

Prices across some carbon markets are expected to inch closer together in 2024, as newer programs break records and more mature schemes cool. Looming net-zero targets are pushing regulators to tighten supply and include more sectors. Meanwhile, the gap between compliance and voluntary markets continues to narrow, as recently established compliance programs appear more lenient on the inclusion of carbon offsets.

- **Policy:** Carbon border adjustment taxes are gaining support, although the momentum in economies without a carbon price will likely lose steam. Market-tightening reforms across the US and Australia are boosting allowance prices, contrasting the European Union, which will likely see subdued prices in the near term from interventionist measures. New markets and the expansion of existing programs are on the cards: a linkage between the states of Washington and California, the start of a cap-and-invest scheme in New York State, new participants in South Korea, the addition of the cement and aluminum sectors in mainland China, and the inclusion of direct air capture in the EU.
- **Price:** California's carbon price is expected to average around \$42 per metric ton in 2024 and \$46 per ton in 2025, according to BloombergNEF. That's up from \$34 per ton in 2023, supported by financial intermediaries. It could reach as high as \$93 per ton by the end of the decade. Meanwhile, carbon prices in the EU are forecast to average €71 per ton (\$76 per ton) this year, down from €85 per ton in 2023. BNEF then projects the bloc's prices will head towards €149 per ton in 2030. Carbon markets offer investors access to a tool that tracks a diverse set of low-carbon technologies. They could also attract investors looking to shield their returns from high interest rates and inflation.

- **Industrial sectors:** Recession risks and cost inflation have taken a toll on European industrials, lowering their activity, emissions and demand for carbon allowances. Declining power sector emissions in both the EU and across US states covered by a regional carbon market will also limit demand for allowances. Meanwhile, budget cuts for energy transition projects in California could delay emission reductions in the state. Mainland China is also looking to add industrial sectors to its market in 2024, pushing up emissions covered by its mechanism.
- **Offsets:** The price of carbon offsets remains contingent on whether standards can be agreed. Credits could trade at just \$13 per ton by 2030 – not much higher than current prices – if the market continues to operate without rigorous standards, and greenwashing and integrity concerns drive companies away from offsets. But if a robust, universal definition of 'high quality' is established, BNEF modeling puts credit prices at \$20 per ton at the end of the decade. Prices could skyrocket to \$146 per ton by 2030 if the market is restricted to only carbon removals, such as from direct air capture technology that pulls CO₂ out of the sky.

\$20 per metric ton Expected carbon offset price in 2030 under 'high quality' scenario

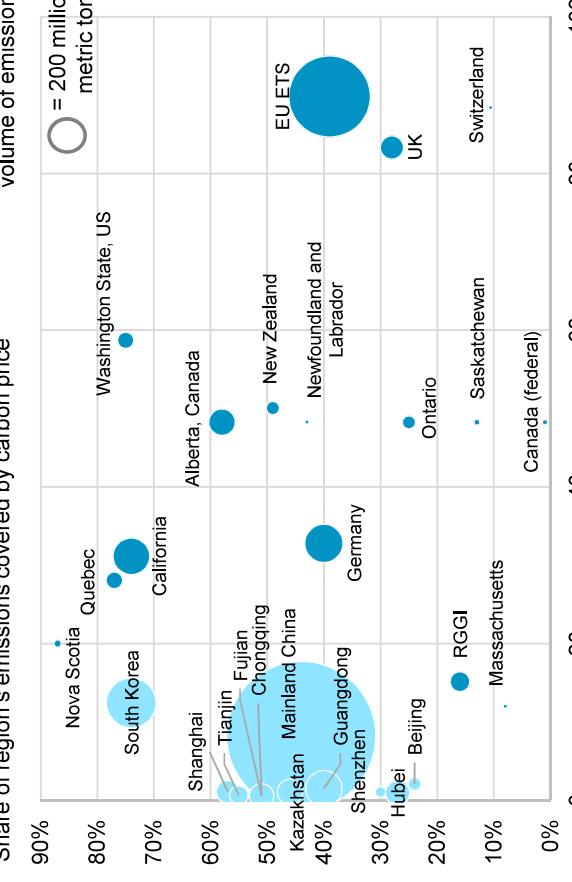
\$93 per metric ton Estimated California carbon price in 2030

\$162 per metric ton Estimated EU carbon price in 2030

Carbon pricing programs by price and share of emissions covered

• Market - Annex I • Market - Non-Annex I

Share of region's emissions covered by carbon price



Bubble size: Jurisdiction's volume of emissions

○ = 200 million metric tons

Source: Governments, exchanges, World Bank, BloombergNEF. Note: Includes fully launched carbon markets at international, economy and state/province level. ETs prices are average over 12 months to August 16, 2023. RGGI refers to the US Regional Greenhouse Gas Initiative; EU ETs is the EU Emissions Trading System.

Ten drivers that will move carbon markets

Net-zero ambitions contingent on carbon markets

Key drivers for 2024

Policy

New compliance markets more favorable to offsets inclusion



Carbon border tariffs spur momentum

Carbon market growth supports private energy transition funding

Price

US carbon prices rush ahead with EU behind



Financials' influence grows in both US and EU

Gas dependency lingers in US, supporting prices

European power sector emissions plunge with little recovery in sight



Power and industry



UN-backed offset market struggles to take off

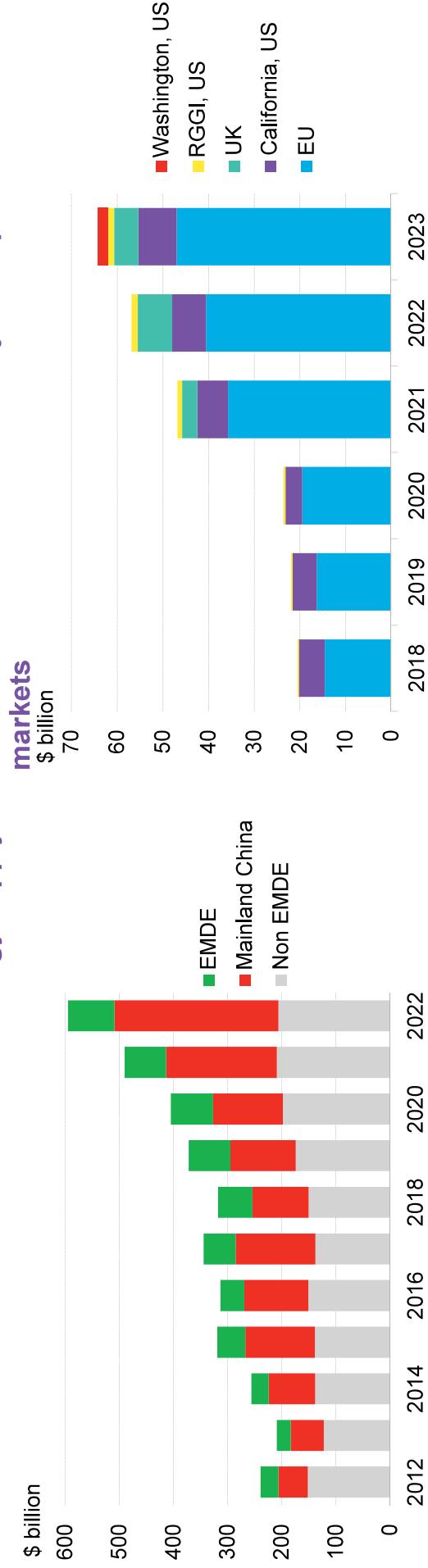
Offsets increasingly being recognized as sovereign assets



Offsets

Carbon market growth supports private energy transition funding

Global annual investment in low-carbon energy supply



Source: BloombergNEF. Note: EMDE refers to emerging markets and developing economies.

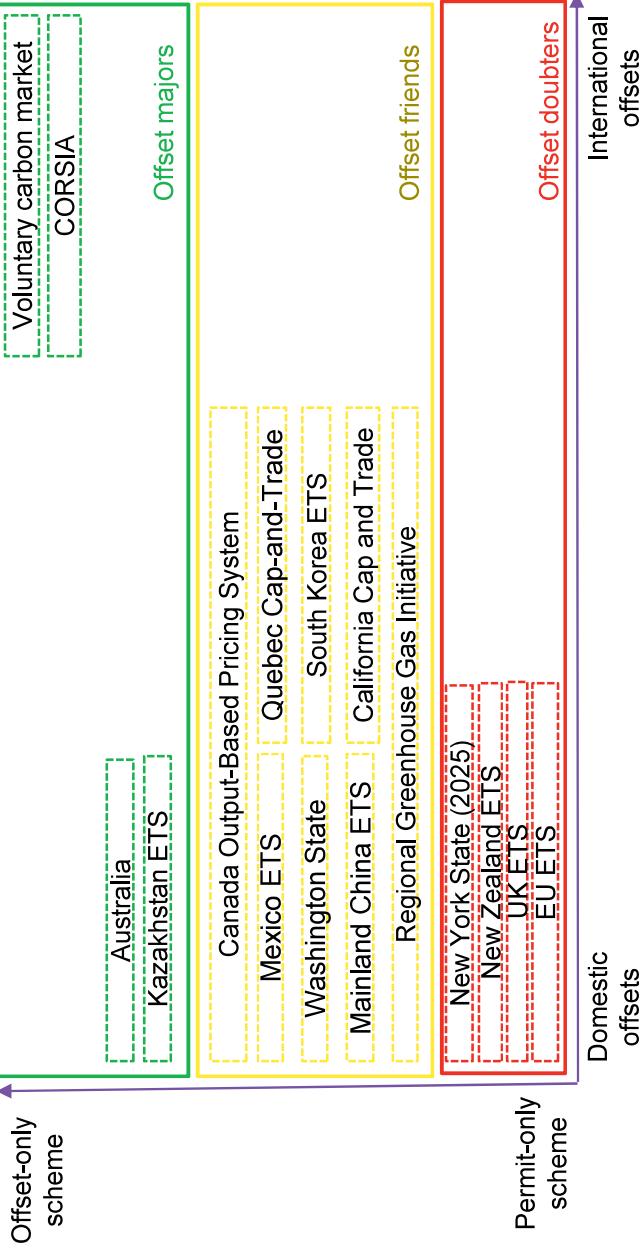
- Compliance carbon markets can play an important role in providing funding for the energy transition, but the scale is often underestimated. This rings particularly true for developed economies, where investment in low-carbon energy supply has started to stagnate.
- Global investment in low-carbon energy supply jumped 21% year-on-year to a record \$595 billion in 2022, according to BNEF. While mainland China accounted for a major part of this increase, energy-transition funding is also gaining traction in other emerging markets and developing economies (EMDE). Investment across EMDEs rose 11% in 2022, hitting an all-time high of \$85 billion. Meanwhile, non-EMDE investment slipped 1%, to \$206 billion. For more, read *Mobilizing Capital in and to Emerging Markets* ([web | terminal](#)).

Source: BloombergNEF. Note: RGGI refers to *Regional Greenhouse Gas Initiative*.

- Focusing specifically on the allowance auction revenues from major European and US compliance carbon schemes – namely the EU and UK emissions trading systems, the US Regional Greenhouse Gas Initiative, Washington State's cap-and-invest market and California's Cap-and-Trade Program – they raised almost \$57 billion in 2022 and over \$64 billion in 2023. This is equivalent to around 30% of all investment in low-carbon energy supply for non-EMDE markets in 2022.
- Revenues from both EU and US carbon allowance auctions have been primarily invested in consumer benefit programs covering energy efficiency, renewable energy, direct energy bill assistance, and other emission reduction programs.

New compliance markets see offsets in more favorable light

Compliance markets and carbon offsets

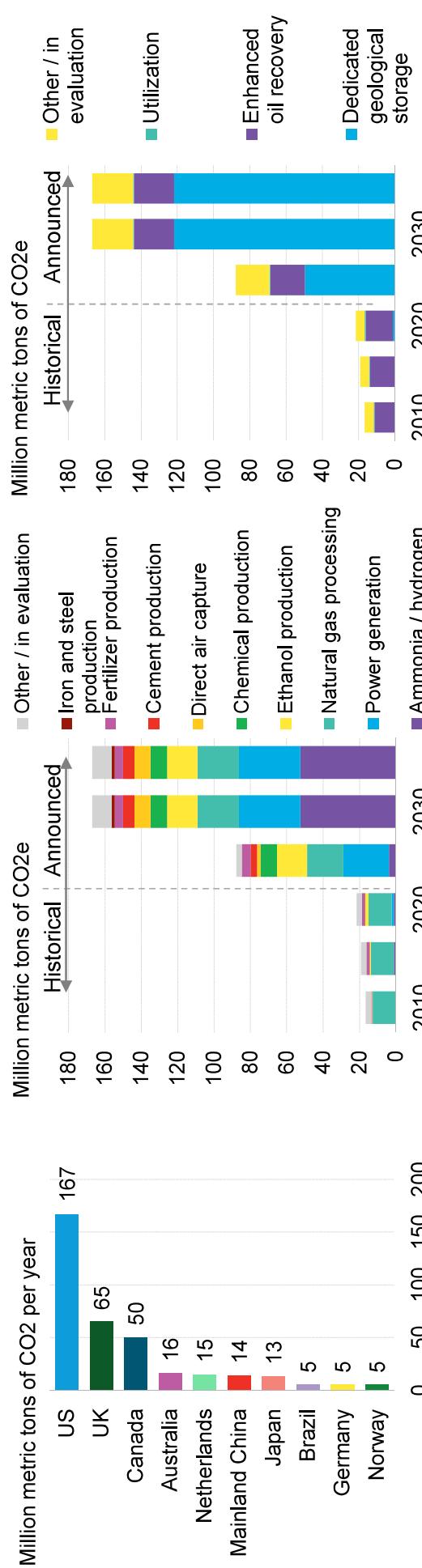


- New carbon markets appear more willing than established programs to drop their guard and allow offsets. Eleven compliance carbon markets around the world now permit the use of offsets in some form.
- Established schemes, such as in the EU and the UK, avoid offset usage largely because of credit quality concerns. Meanwhile, newer markets, including those in the US state of Washington, as well as mainland China and Mexico, have all agreed to allow some offset usage to fulfil compliance obligations.
- One market bucking this trend is New York State, which plans to launch in 2025. The development of its economy-wide market occurred as the integrity of offsets was increasingly being called into question, which

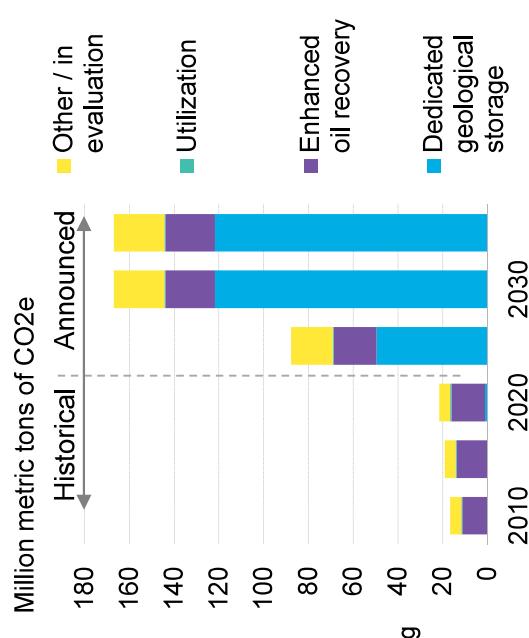
- discouraged regulators from allowing the inclusion of credits.
- The uptake of compliance offsets – meaning the carbon credits generated by schemes linked to a compliance market – could change the dynamics in global offset markets. More expensive and higher-quality projects could be drawn to compliance markets, which typically have strict criteria for eligible offsets mitigating reputation risks from their usage – an issue that has plagued the voluntary carbon market to date.

Overlapping policies pose risks to carbon market balances

Proposed carbon capture capacity in 2035, by region



Carbon capture capacity in the US, by point source



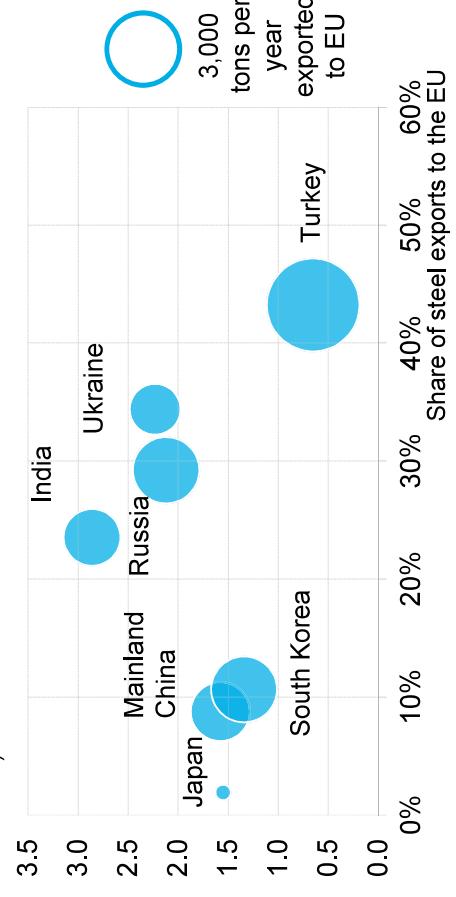
Source: BloombergNEF. Note: For more, see CCUS Market Outlook 2023: Announced Capacity Soars by 50% ([web | terminal](#)).

- Compliance carbon markets, together with other policies such as the US Inflation Reduction Act, can help to quickly scale up clean technologies like carbon capture utilization and storage (CCUS), hydrogen and biofuels. Achieving net-zero emissions will require multiple policies, as demonstrated in BNEF's New Energy Outlook US ([web | terminal](#)).
- The CCUS industry is an example of the interplay of multiple policies. This is particularly true in the US, which is currently the top CCUS player with a 40% market share of commissioned capacity in 2022.
- Global annual capture capacity is set to jump more than eightfold between now and 2035. Based on announced projects, planned capacity in the US totals 167 million tons per annum by 2035, nearly 26% higher than this point last year. This dominance is supported by the Inflation Reduction Act and Bipartisan Infrastructure Law. The new abatement projects could eat into demand for emission allowances in US carbon markets.
- Policymakers will need to take into consideration the uptake of low-carbon technologies within their carbon market design to ensure there is no oversupply of allowances. California, for example, is in the midst of an update to include CCUS as an approved abatement technology to ensure its impact can be incorporated into the scheme's design.

Border tariffs spur carbon market momentum

Markets exporting steel to the EU and exposure to bloc's carbon tariff

Emissions intensity of steel production (metric tons of CO₂ per ton of steel)

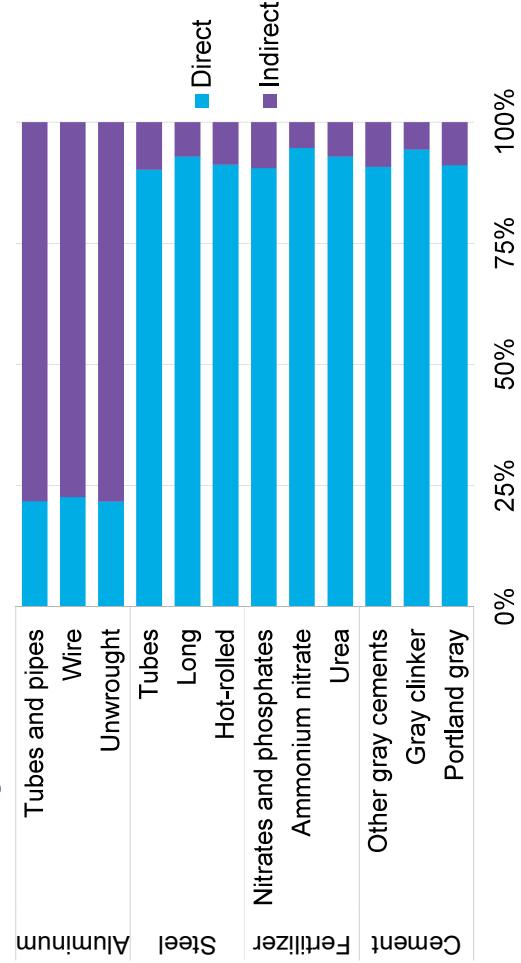


Source: BloombergNEF, World Bank. Note: 2019 exports used to indicate trends prior to the Covid-19 pandemic and Russia's invasion of Ukraine.
Emission intensities refer to direct emissions.

- The EU Carbon Border Adjustment Mechanism (better known as CBAM) was introduced as a non-tariff reporting obligation in October 2023. Questions remain over how the levy will be brought in and what emissions and sectors will be covered. As it stands, the carbon tariff will be less onerous for products whose indirect emissions matter more, such as aluminum.

- Regardless of the uncertainties, other geographies have wasted no time in putting forth their own variations. The UK confirmed its own CBAM on December 18. Over the coming year, it is expected to add details and – if a general election doesn't get in the way – legislation towards implementing the scheme.

Share of direct and indirect emissions for products covered by EU carbon tariff



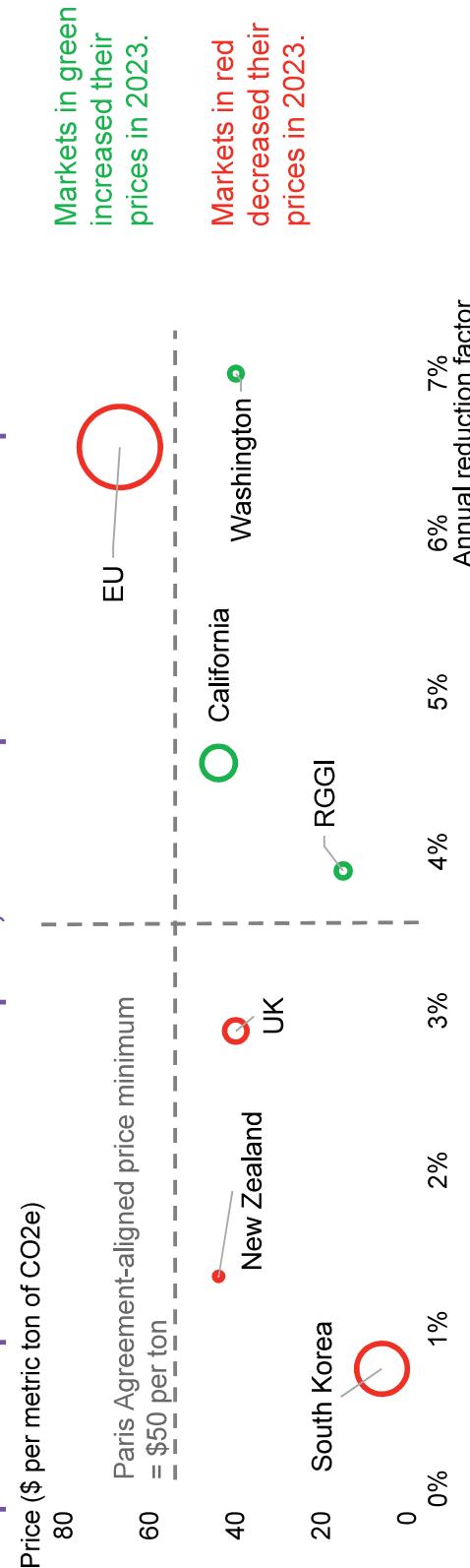
Source: European Commission, BloombergNEF. Note: Direct emissions refer to emissions released by production processes. Indirect emissions refer to those associated with generating electricity used by production facilities.

- Meanwhile, Canada and Australia could announce their own carbon tariffs in 2024 and have officially been investigating the possibility of doing so. In the wake of a series of proposed (and unsuccessful) bills for a federal carbon border adjustment over 2023, the US will continue to see growing momentum for its own carbon tariff. But an election year and the absence of a US-wide carbon price make such a move unlikely – for now.

- Alongside copycat tariff schemes, the EU's introduction of the levy has spurred momentum for other geographies to establish their own carbon markets, which would see them avoid paying the cost. A cap-and-trade market is on the cards for India, while mainland China is looking to add industrial sectors to its existing scheme in the coming years.

US and EU carbon markets shrink cap to accelerate transition

Compliance cap-and-trade markets price, annual cap reduction and cap size



Source: Governments, BloombergNEF. Note: Size of the circle represents the cap for 2023. The annual reduction factor refers to the annual emissions cap reduction rate compared to the 2023 cap. 'RGGI' refers to the US Regional Greenhouse Gas Initiative. EU added shipping in 2024, which increases the cap for 2024. Price comparison refers to year beginning 2023 and the end of 2023.

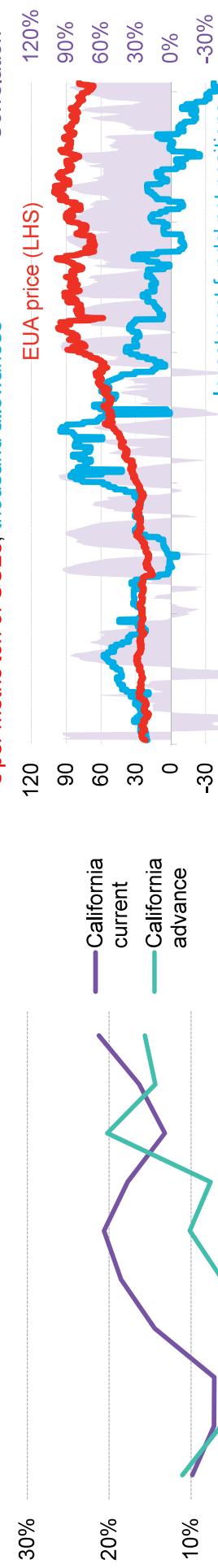
- The EU carbon market sits above the minimum carbon price deemed necessary to meet the Paris Agreement's climate goals – \$50-100 per ton by 2030, according to the High-Level Commission on Carbon Prices. Meanwhile, prices in Washington State, the linked California-Quebec markets, New Zealand and the UK sit just below. Asia Pacific markets and the Regional Greenhouse Gas Initiative (RGGI) in the Northeast US are still trading at a significant discount to the Paris-aligned benchmark.
- Alongside the EU, US markets, namely Washington State, California and RGGI, have the highest climate ambitions measured by the annual cap reduction in percentage terms. Interestingly, they are not priced the highest, although these markets have been breaking their own records and their prices rose more than their cap-and-trade market peers in Asia and Europe in 2023. The limited scope and price containment mechanisms have put a lid on prices.
- The EU picture is a not so straightforward in 2024. Although it has a large cap decline of 6.5%, supply will decline by only a modest 1% as a result of additional allowances being added to the market under the REPowerEU policy.
- Meanwhile, Asia Pacific markets have the lowest climate ambition and are trading below their peers.
- Carbon markets must continually be reformed to align with the structural changes in the economy and climate targets. Indeed, most of the major markets, such as the EU, UK and California, are undergoing reforms now. These revisions appear to be unphased by high commodity prices, supply chain shortages and high geopolitical risks, reinforcing the importance of carbon markets as a climate policy tool.

Ten drivers that will move carbon markets

Financials' influence grows in both US and EU

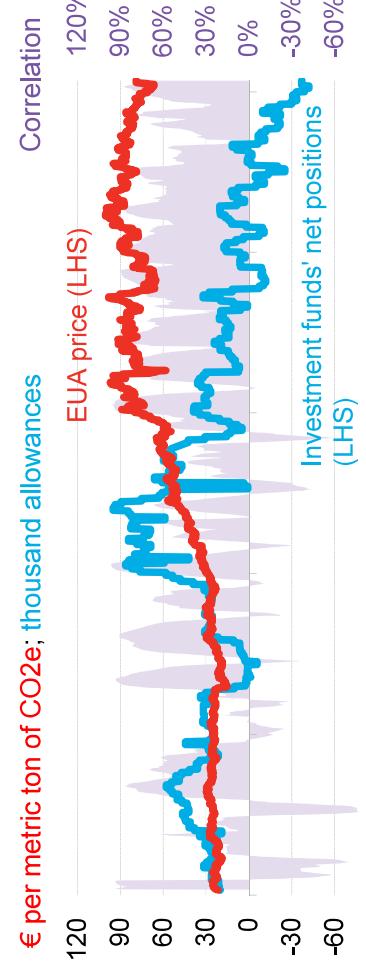
Auction volume portion won by non-compliance entities

Percentage secured



Source: California Air Resources Board, Regional Greenhouse Gas Initiative, BloombergNEF.

EU carbon price correlation to investment funds' net positions



Source: BloombergNEF, COT from EEX and ICE. Note: EUA refers to EU emission allowances.

- The latest auction of 2023 in California saw speculators secure over 20% of the current-year allowances sold, on average. This is almost three times the group's winning share in 2014. Meanwhile, non-compliance entities snatched up over 15% of advanced auction allowances.

- The correlation between EU allowance price movements and investment funds' net positions has also become more pronounced as the positions defined as 'commercial undertakings' have reduced.

- Investors have been piling into US compliance carbon as they look for products that offer a hedge against inflation. They are also betting on the determination of policymakers' climate ambition to squeeze supply and the inelastic nature of compliance demand.
- The number of holders among participants referred to as 'investment funds' in the EU market has largely remained steady. However, the ratio of speculative positions to hedging positions has doubled, according to a study commissioned by the European

- Financial players play a critical role in carbon markets by adding liquidity and price discoverability. Their increasing presence in California's market could lead to higher speculative price volatility, which could encourage industries to readjust their carbon strategies. This could be a win-win situation, with investors getting their return and industrials getting their required price signal for low-carbon project development. Markets that do not allow outside compliance entity trading can often see low and static prices.



European power emissions plunge with decarbonization here to stay

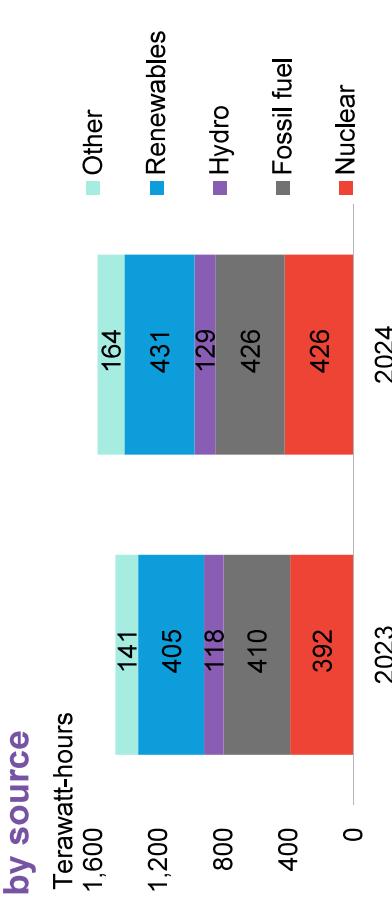
Power emissions in selected European markets



Source: BloombergNEF, European Power Markets Monitor – LiveSheet (1.9) ([web terminal](#)). Note: Markets include France, Italy, Germany, Spain, Belgium, Portugal, Poland, the Czech Republic, Austria, Netherlands and Nordpool. Sum of hydro generation takes data from France, Switzerland, Italy, Spain and Nordics. Data as of January 30, 2024.

- The power sector accounts for the largest share of emissions in most carbon markets globally, with some schemes only covering electricity generation, such as RGGI. Even in the EU Emissions Trading System (EU ETS), power represents around half the emissions covered.
- Europe's emissions fell as electricity generation from fossil fuels sunk 23% in 2023. This is thanks to capacity phase-outs, high renewables output and power demand destruction. Coal saw the biggest proportional year-on-year decrease, at 30%, due to planned plant closures and the improving economics of gas. As a result, gas generation dropped by a more modest 21%.
- While some power demand is expected to return in 2024, renewables are still set to dominate the generation mix. The five major European power markets – Germany, Great Britain, France, Italy and Belgium – are estimated to build 34 gigawatts of renewables capacity this year, up

Historical annual power generation and BNEF's outlook by source

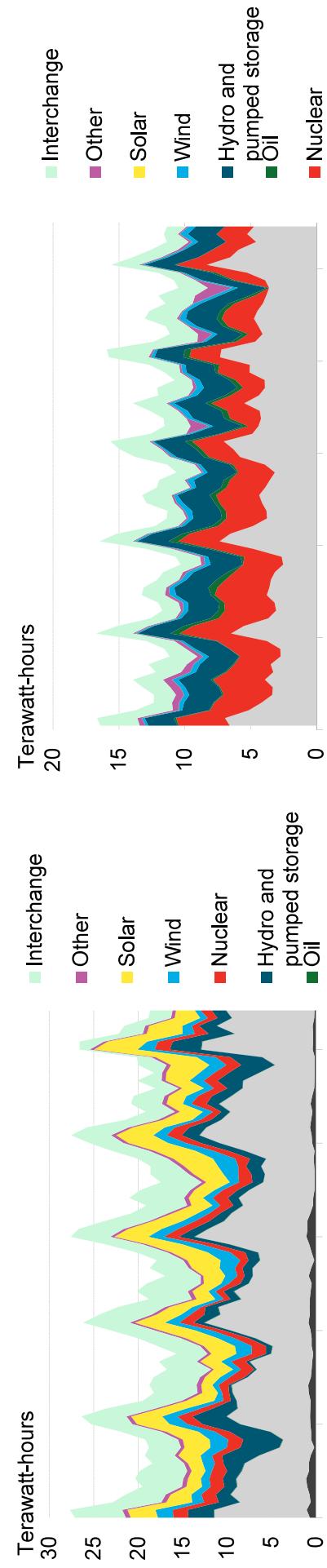


Source: BloombergNEF. Note: Includes Belgium, Germany, France, Italy and Great Britain, excluding interconnector load with neighboring markets. "Other" includes oil, biomass, geothermal, uncategorized renewables and other fuels.

- from 31GW in 2023, according to BNEF. This would contribute to a combined 26 terawatt-hours, or 6%, rise in renewables generation year-on-year.
- BNEF also expects a rebound in French nuclear output and a recovery in European hydropower generation to continue in 2024. This should add 44TWh of power supply across the five major markets, up 9% from 2023.
- Improved nuclear maintenance schedules enabled France to boost its fleet availability to 60% in 2023, from 52% in 2022. BNEF expects this to keep improving to an average of 70% in 2024, producing 356TWh of electricity. Meanwhile, Europe's hydro output is set to return to past-year averages, after being hit by a drought in 2022. This should translate to 129TWh of electricity in 2024, up 9% year-on-year.

Gas dependency lingers in US, supporting prices

CAISO power generation by fuel



Source: US Energy Information Administration, BloombergNEF. Note:

Interchange refers to imports.

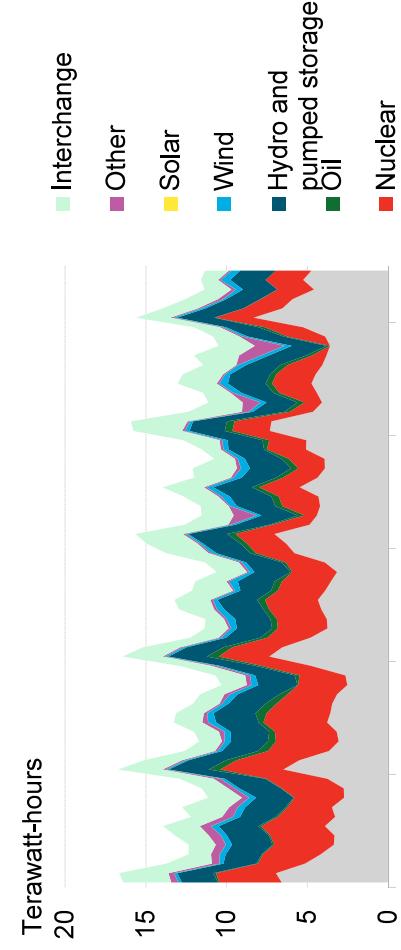
- Electricity represents 19% of total emissions in California's carbon market, dominated by gas-fired generation. Gas-to-power output has been on an upward trend since 2018, spurred in part by a 46% reduction in electricity imports from 2019 to 2023. This reflects a lack of low-carbon alternatives in the power sector, supporting carbon prices.

- However, to boost low-carbon generation capacity, lawmakers have voted to extend the lifetime of two units of the Diablo Canyon nuclear plant beyond their scheduled retirement in 2024 and 2025. This will buy time and be helped by 4.7GW (in direct current) of new solar capacity, 5GW of battery storage and 360 megawatts of wind in 2024. Around 2.7GW of gas capacity will also be decommissioned by the end of the year.

- Meanwhile, gas-fired generation in the New York Independent System Operator (NYISO) area has also retained its dominance, with a spike in 2023 due to lower nuclear output. Compared to 2019, gas-fired generation increased by 34%, or 15TWh, and nuclear was down 46%, or 20TWh, in 2023.

- Nuclear capacity in the NYISO region has shrunk since [Indian Point](#)

NYISO power generation by fuel



Source: US Energy Information Administration, BloombergNEF. Note:

Interchange refers to imports.

stopped generating electricity on April 30, 2021. With just over 1GW of capacity, the plant represented 25% of total nuclear capacity in NYISO. Some relief will come in 2024 as the state adds 1.5GW (indirect current) of solar, as well as 1.2GW of wind and storage. For more, see [2H 2023 US Clean Energy Market Outlook](#) ([web](#) | [terminal](#)).

- New York's power sector is currently included in RGGI. The state is also looking to set up its own emissions trading scheme covering more sectors in 2025, which will likely sit at a higher carbon price. This is thanks to the economy-wide coverage including transportation and industry, which have higher costs of abatement.
- A higher carbon price could further spur renewables deployment and push out some gas generation from the mix. However, New York and California will need to address the regulatory hurdles and delays related to permitting and interconnections that have limited renewables uptake. The offshore wind industry has also faced headwinds from high supply chain costs and interest rates, leading to delays and contract cancellations. For more, see [Offshore Wind Market Outlook 2H 2023: Ramp-Up Delayed](#) ([web](#) | [terminal](#)).

Offsets being recognized as sovereign assets increases government intervention

Nationalism						Internationalism
Government tax	Benefit sharing	Restricting exports	National/regional registry/exchange	Bilateral agreements	Foreign investment	
Zimbabwe					Tanzania	
Kenya		India		Zimbabwe	Kenya	
Tanzania		Indonesia		Kenya	Honduras	Liberia
Zambia		Papua New Guinea		Indonesia	Malawi	Zambia
				India	Liberia	Mozambique
				Malawi		Zimbabwe
				Bahamas		
					Kenya	Tanzania

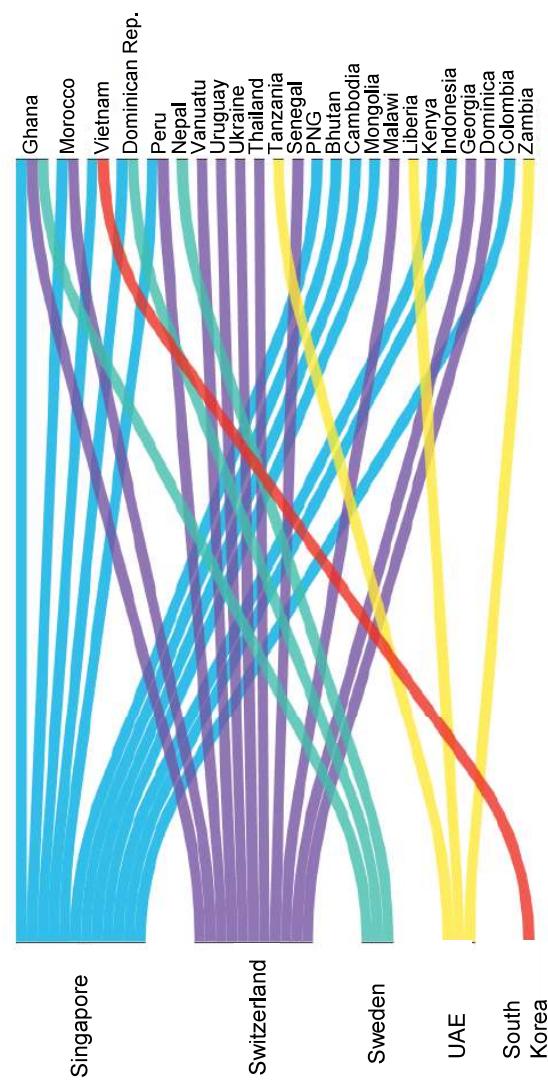
Source: BloombergNEF. Note: Mechanisms highlighted in blue contribute to ‘carbon nationalism’ strategies in an economy’s carbon offset market, given the government’s intention of benefiting from local carbon-sink resources. The ones highlighted in purple follow a ‘carbon internationalism’ approach to realizing the value of carbon abatement resources. Overall, all of the listed mechanisms are aimed at benefiting from domestic carbon offsets, and economies use a combination of mechanisms depending on their current offset market and potential to scale in the future.

- Governments are increasingly aware of the economic and geopolitical value of carbon offsets, recognizing them as sovereign assets. Consequently, some governments with high abatement potential are asserting control over their carbon offset markets, which used to be entirely operated by the private sector.
- To date, 12 governments have enacted nationalism or internationalism policies, or a combination of the two. The nationalism approach often materializes as imposing taxes, such as in Zimbabwe, restricting exports, as in the case of India, or establishing a national trading platform, like in Indonesia.
- On the other hand, governments such as Kenya and Tanzania have taken a more internationalist approach towards developing their offset markets, where they rely on international trade through bilateral agreements, and attracting foreign investment to expand project development.
- While these policies may seem insignificant in isolation, their effect will be felt across the global voluntary carbon market. In aggregate, these measures could cut cumulative global offset supply between 2030 and 2050 by around 11%. Supply curtailment, in addition to higher costs due to imposed taxes, could raise offset prices by 63% in 2050, relative to BNEF’s baseline scenario where the market largely operates as it does today. For more, read Carbon (Inter)Nationalism: Capitalizing on Offsets’ Value (web | terminal).

Ten drivers that will move carbon markets

UN-backed offset market struggles to take off

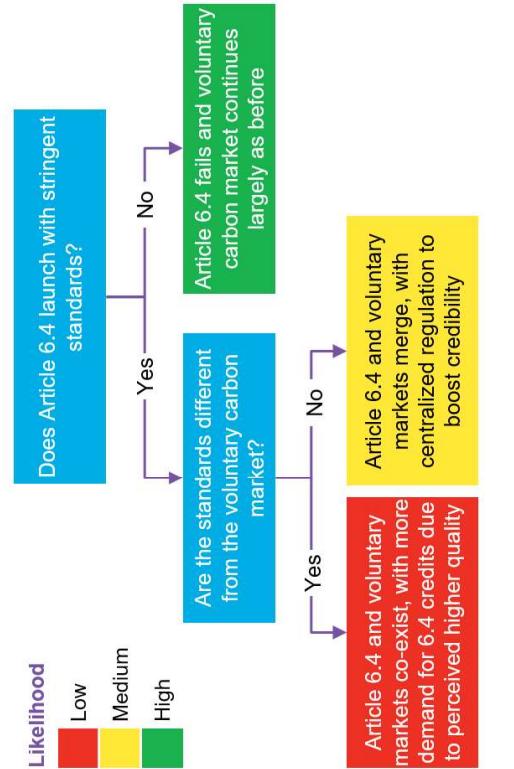
Recent Article 6.2 bilateral agreements



Source: BloombergNEF, International Emissions Trading Association Note: Agreements include deals that occurred in the lead-up to and during COP28. PNG is Papua New Guinea.

- Hopes for progress on the international trading of carbon offsets (as laid out in Article 6 of the Paris Agreement) evaporated at the COP28 climate summit towards the end of last year, as countries rejected the texts in the final stretch of the talks.
- The mechanisms being discussed will enable parties to achieve their climate goals using offset trading via bilateral agreements (Article 6.2) or a new global market (Article 6.4). In particular, governments and other stakeholders had aimed to make sufficient progress in Dubai to fully implement Article 6.4 and authorize the issuance of carbon credits under the UN. Discussions are expected to begin from scratch at COP29 in Baku, Azerbaijan.
- Questions around the to-be-established Article 6.4 mechanism and the voluntary carbon market have now been parked as the latter will prevail for companies looking to offset their emissions in the near term. It is likely the disagreements will now see stricter standards being adopted surrounding Article 6.4. So, while the delay is disappointing, could in fact be a blessing in disguise.
- Interestingly, while the voluntary carbon market had a turbulent year, the COP28 debacle appeared to push corporates back to buying these credits in December. The purchasing and retiring of offsets hit a record 164 million in 2023, up 6% from 2022.

Possible short-term effects of Article 6.4 on the voluntary carbon market



Source: BloombergNEF

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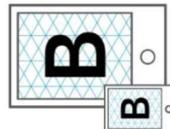
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