

Policy Paper

Financial Accounting For Carbon Finance: A New Standard For A New Paradigm

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About this paper

This policy paper offers new insights into carbon financial accounting and extends our published overarching [COP26 Green Finance Report](#). The latter was developed in collaboration with the British High Commission, the COP26 Universities Network, and the Singapore Green Finance Centre, and presented analysis and insights into carbon credits financial accounting policymaking in the Association of Southeast Asian Nations (ASEAN).

Delivered with the collaboration of the industry, this white paper is addressed to policymakers, regulators, and the financial industry—primarily banks, asset managers, exchanges, and marketplaces. Its aim is to help readers understand the global carbon markets financial accounting regulatory framework and related policymaking challenges, and to suggest concrete policy recommendations.

The report focuses on certified carbon offset credits (i.e., carbon offsets) as transferable and tradable financial instruments based on IFRS definitions. It also addresses the lack of transparency and faithful financial accounting representation, concluding with the need to establish a specific standard and revisit the definition of financial instruments for carbon offsets.

Drawing on industry insights from leading institutions, senior officials, and policymakers regarding the common understanding of carbon offsets across Europe, China, and Singapore, the paper develops recommendations based on these insights. This topic is highly sensitive, and we respect the anonymity and discretion claimed by industry contributors.

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1. Executive summary

While the emergence of global carbon markets has created numerous opportunities, it also presents significant challenges. In particular, the new investable assets that this shift has created, in the form of carbon offsets¹, call for a specific standard for this new asset class. Relatedly, there is a need to review and expand the existing definition of financial instruments in this context. A transparent and faithful accounting representation is needed sooner rather than later, as currently, there is no specific accounting definition for carbon offsets as financial instruments in the financial accounting regulations, nor standard guidelines for this.

The reason for this absence of detailed standards and regulation is the widespread lack of understanding about carbon offsets as new financial instruments and investable assets. While it is important to highlight the efforts of the [IFRS Foundation](#) to improve the sustainability standards focused on reporting², these efforts have not yet encompassed financial accounting. Thus, there is still a strong need for a project that addresses how to reflect the financial accounting of these new instruments in the financial statements. Notably, such a project would offer a solution for both sustainability standards and accounting.

In this report, we propose a simple, clear, and robust accounting regulatory framework with just a few measures that will help achieve the required transparency in global carbon markets. In terms of governance and leadership to tackle this project, we believe that the [International Accounting Standard Board \(IASB\)](#) is the most appropriate regulatory body, as it is both more qualified to work on this initiative and more influential than other organisations. The rationale is that the IASB, as the accounting standard-setting board of the IFRS Foundation, should retake the “[Emissions Trading Schemes Project](#)” and provide clear and consistent guidance on its carbon markets accounting rules.

Regulatory initiatives and debates have started, and some local regulators have issued different technical approaches. However, we need an international standard to establish a level playing field to avoid regulatory arbitrage.

The research aim and objectives

The objective of this policy paper is to assess the current accounting framework for global carbon markets under IFRS, informed by comprehensive insights from the industry and practitioners. The result is an evidence-based and practical set of recommendations intended to inform regulators’ and policymakers’ decisions.

Methodology

To offer evidence-based guidance informed by real experience and insights from the financial industry, we employed questionnaires and interviews with senior management from banks, asset managers, carbon trading exchanges, and policymakers with a deep knowledge of carbon markets and their business model. Results are summarised and presented as anonymised data. The list of questionnaires is presented in Annex I.

The research findings

- Carbon offsets should not be considered intangible assets or inventories, but rather, investable assets used within the bank's offering for its corporate clients as derivatives or other financial instruments for offsetting and hedging purposes.
- A specific standard for carbon offsets is required to establish a level playing field in the carbon market's financial accounting framework. Regulators should also revisit the definition of "financial instruments" under [IAS 32 as financial assets in the context of global carbon markets](#). At present, a spot carbon offset does not comply with the IAS 32 definition of a financial instrument, which is why it is typically accounted for as inventory or an intangible asset.
- This inaccuracy is the reason why we advocate for a change in the standards to amplify the definition of the financial instrument or to develop a new category of instruments at fair value through an identifiable reported line item in the income statement that would reflect the actual management and goals of financial entities with these instruments.
- In sum, based on the "faithful representation principle"³, good reporting on these products would mean including them among the financial instruments and applying ["fair value criteria" as defined in IFRS 13](#) as a separate reported line item both in the balance sheet and within the income statement.
- The current lack of clarity and guidelines about carbon markets' financial accounting and risk management has an impact on regulatory capital requirements for banks through the Fundamental Review of the Trading Book (FRTB)^{4 5}, which includes higher capital charges for carbon trading under the standardised approach to market risk. This impact has [implications for banks in their role as intermediaries in the global emissions trading system \(ETS\)](#).

2. Introduction

This policy paper systematically analyses the current nascent accounting regulatory framework for global carbon markets and presents key industry insights drawn from banks, asset managers, and leading senior executives. Our findings indicate the urgent need for policymakers and regulators to establish clear guidelines in this area, as rapidly evolving capital markets for carbon must tackle transparency issues to secure their integrity and market efficiency.

Carbon offsets, as financial instruments, have become investable assets⁶ that industry investors can use to further their decarbonisation and net zero strategies. Yet, there is neither a specific financial accounting definition for carbon offsets nor clear, comprehensive regulation on how to account for these offsets. Hence, a level playing field for the valuation and reporting of carbon offsets should be created sooner rather than later.

On 3 November 2021, the IFRS Foundation⁷ announced the creation of a new standard-setting board: the [International Sustainability Standards Board \(ISSB\)](#). This development represented a milestone for high-quality corporate reporting of entities, using common standards to allow international comparability.

However, we believe that although it is very reasonable to support the commitment to reporting standards, it is also necessary to support the development of new accounting standards that economically reflect this reality in the financial statements of companies.

Accountants, auditors, and users of financial statements have welcomed these reforms directed at reporting, but they expect a standardised system for carbon offsets financial accounting, which will lead to greater transparency and integrity for the fast-growing global carbon market. At present, the sustainability standards are entirely focused on reporting through the ISSB⁸ and not on the financial accounting that is reflected in the financial statements.

Accordingly, this paper responds to the following questions: (i) What is the current regulatory framework in financial accounting for carbon markets? (ii) How should carbon credits be valued at the point of purchase? (iii) How should they be recorded in the income statement?

Answering these questions will expand our understanding of carbon financial accounting and yield valuable recommendations for regulators.

Global carbon markets

The total value of global carbon markets grew by 164% to a record 760 billion euros (\$851 billion) in 2021⁹. Currently, there are two types of carbon markets: compliance carbon markets and voluntary carbon markets.

Compliance carbon markets (CCMs), where mandatory national, regional, or international regimes trade and regulate carbon allowances, led to emissions reductions. The largest of these CCMs, the European Union's Emissions Trading System ([EU ETS](#)), launched in 2005, accounts for 90% of the total value of the global CCM.

In contrast, voluntary carbon markets (VCMs), where companies and individuals trade carbon credits on a voluntary basis through investment in these credits and offsetting their emissions, ended 2021 with a market size of just \$1 billion. However, we expect VCMs to keep growing, allowing companies to achieve their net zero targets, which will involve carbon offsets.

In 2021, [China launched its national ETS \(in mid-July\)](#)¹⁰ and [the UK also launched a carbon market](#), replacing its participation in the EU ETS, to drive investment away from fossil fuels (although the UK might make a U-turn back towards fossil fuel investments due to Russia's invasion of Ukraine and its effect on the global energy map). Despite the development of these markets, the participation of institutional investors in global carbon markets remains limited, with the main obstacles being market efficiency, liquidity, transparency, and market dynamics with the pricing. Yet, although investors face the issue of a lack of clear guidance for an accounting framework in carbon markets, heavy industry emitters are starting to raise carbon credit funds to help decarbonisation.

In the VCM space, there have been sound improvements in trustworthy market infrastructure—such as [Climate Impact X in Singapore](#) and the [London Stock Exchange's Voluntary Carbon Market](#)¹¹ [solution through listed funds](#)¹²—to provide access to capital at scale for the development of projects, and primary market access to high-quality carbon credits for corporates and investors.

3. A new standard for a new paradigm

Governments and industries around the world are introducing non-standardised and specific schemes designed to encourage a shift towards reducing emissions of pollutants and adopting greener sources of energy. These schemes can vary widely, and a company must understand its rights and obligations under each scheme when determining the financial accounting to promote harmonised practices and comparability on a global basis.

From a financial accounting perspective, carbon credits/offsets and carbon permits/allowances, “carbon offsets”¹³ hereafter) raise valuation, measurement, and financial reporting considerations, many of which will need to be addressed by professional accountants, standard setters, regulators, and academics as carbon trading markets emerge worldwide¹⁴.

Thus, capital markets are evolving rapidly, incorporating new financial instruments for carbon markets where very different schemes and products are emerging. In this context, **there is no consensus on how to account for the new financial instruments**. Additionally, in the case of VCMs, there are valuation and investor confidence problems, and these markets must tackle the issue of lack of transparency to secure their integrity and market efficiency.

Our main concern is that **there is no clear financial accounting guidance on these financial instruments**, alongside the lack of urgency and the absence of regulatory actions to develop a comprehensive framework. Banks and other industries generally give information about carbon offsets in their management reports but not in their financial statements.

In our opinion, standardised carbon accounting measures, financial disclosure, methodology, and due diligence standardisation would be welcomed by many stakeholders, as these would foster harmonisation across the industry. These developments are also likely to be welcomed by institutional investors, allowing them to scale up VCMs. Such standardised practices are needed to facilitate a sound reporting system and comparable information about these products in financial statements.

In conclusion, there is **an urgent need to increase the transparency of accounting practices for carbon offsets in the near term as these markets continue to evolve rapidly**. Examining the current regulatory framework reveals the key gaps and challenges that any such efforts towards transparency must address.

4. A review of the current regulatory framework and practices in financial accounting for carbon offsets

At present, accounting regulation standards, whether international or local, only cover known realities with specific definitions (e.g., a financial asset, a derivative, or a construction contract)¹⁵. **Crucially, there is no specific financial accounting definition for carbon offsets**. Recently, the [ISSB issued the \[Draft\] IFRS S2 Climate-related Disclosure](#) (i.e., the Exposure Draft). The objective of the Exposure Draft is to require an entity to provide information about its exposure to climate-related risks and opportunities. A definition of carbon offset is included in this Exposure Draft for reporting purposes only.

In this context, in the absence of a specific definition in the accounting frameworks for carbon offsets, other accounting definitions that already exist and that correspond to other previous realities are sought so that, as far as possible, they can come close to covering the needs of these carbon offsets.

Consequently, **there is no clear guidance or complete standard on how to account for carbon offsets**. The reason for this gap is that these products and their markets are new, and no specific accounting framework has been developed. Nonetheless, some regulatory initiatives and debates have been started, and some local regulators have issued different technical approaches.

Due to the wide-ranging use of financial reports by multiple stakeholders, policymakers must consider the following aspects of certified carbon offset credits accounting (carbon offsets): (i) valuation and reporting of carbon offsets; (ii) valuation and reporting of the intangible assets capable of creating carbon credits; and (iii) comprehensive reporting on organisational progress towards ESG responsibilities.

In sum, **a new standard in carbon offsets accounting is needed to achieve international harmonisation**.

a. The IFRS approach

IFRS¹⁶ do not explicitly address the financial accounting for carbon offsets. Specifically, [IAS 8](#) states that in the absence of any IFRS that apply specifically to a transaction, [management must apply its judgement](#) to develop an accounting policy in which it must consider:

- The requirements of other IFRS dealing with similar issues.
- The definitions and evaluation criteria of the Conceptual Framework for Financial Reporting.

Additionally, entities may consider the **pronouncements of other standards** with a similar conceptual framework to develop accounting standards and other accounting literature alongside accepted industry practices (provided they do not contradict the requirements of the conceptual framework and IFRS precepts that deal with similar topics).

To the extent that international standards do not currently provide clear guidance on accounting for carbon offsets, there might be specific developments by accounting associations of regulators in each country. However, [a significant number of countries apply IFRS, or standards based largely on these standards](#): 144 jurisdictions out of 167 require IFRS Standards for all or most domestic publicly accountable entities (listed companies and financial institutions) in their capital markets. According to IFRS information, "the GDP (2018 data) of profiled jurisdictions that require or permit the use of IFRS Standards for domestic publicly accountable entities (listed companies and financial institutions) constitutes 54% of the GDP of all profiled jurisdictions."¹⁷

This information gives a sense of how important these international standards are in economic terms, with only two nations not applying IFRS but still having top GDPs—China and the United States^{18 19}.

In conclusion, it would be highly desirable to have an international criterion under these standards to preserve the international significance and context of these accounting and financial reporting standards.

b. Disclosure is not the beginning of the story

We strongly welcome the developments by the [ISSB](#), [EFRAG](#), and the [SEC](#) in support of detailed disclosures about sustainability and also specifically about carbon offsets; all three institutions issued draft sustainability disclosure standards in 2022. We agree with the general objective that disclosing an "entity's transition plan" towards a lower-carbon economy is important for enabling users of general purpose financial reporting to learn about the decarbonisation-related risks and opportunities related to the entity, such as cost evaluation of carbon capture and the related cost of equity²⁰.

On the other hand, we also welcome the strong emphasis made by regulators when developing these standards on the need for a close **link between sustainability information and financial statements**, as this information must be coherent, homogeneous, and based on the same principles. This is where we have a deep concern: if carbon offsets are not well represented and identified in the financial statements, then it becomes impossible to accurately trace their impact²¹.

Accordingly, we argue that **disclosures should not be the beginning of the story**. On the contrary, disclosures are the consequence of events, and these events must be well represented in the financial statements to offer a faithful picture of what they represent. We would like to note that disclosure is not costless. First, there are the direct costs of collecting, processing, and publishing information. Second, indirect costs can arise if the information is proprietary or if there is a threat of litigation. Therefore, complete disclosure is usually not optimal²².

Stakeholders are likely to positively value regulatory actions that finally ensure global and homogeneous sustainability standards²³. Reporting should have a fundamental relevance and if, for once, **reporting is ahead of events**, this will be a major achievement by international regulators. However, on the way to comply with sustainability reporting, companies, regulators, and supervisors have the **challenge of developing risk assessment/management measurement policies, accounting standards for new products**, and any other new aspect that will undoubtedly arise in this transition towards a new ecosystem characterised by economic resilience.

c. What if crypto assets are used?

The world of **cryptocurrency (crypto) assets** offers a similar example of an area that urgently **needs accounting guidance**. There is a clear gap in terms of financial accounting and reporting standards alongside a lack of global guidance on crypto. The existing financial accounting standards fall short of reflecting the evolving reality arising from these new assets, which (like carbon offsets) require special approaches when it comes to their accounting measurement, treatment, and reporting.

Moreover, there is a close relationship between these two worlds (i.e., carbon offsets and crypto assets) since there are market players who securitise carbon credits into fungible and tradable securities with transparent pricing and real-time settlement through blockchain tokens. Additionally, **blockchain** is another channel where carbon offsets can flow to investors or clients^{24 25}.

In short, the development of accounting standards for crypto would require a much more detailed analysis than is expected in this document. Ultimately, we raise the comparison to point out as an illustrative example how difficult and complex it may be to fit new paradigms into existing accounting and regulatory definitions.

5. Industry insights on carbon offset accounting and reporting

What does the energy crisis mean for carbon markets?

The EU energy crisis, particularly with respect to gas in Europe, has reverted attention to high-emissions energy sources, such as coal-fired power plants; this has increased emissions and financed emissions, potentially also increasing the need for carbon offsets and associated pricing.

As one asset manager whom we interviewed for this report highlighted, “Carbon allowances in the compliance markets such as the EU, California, and China are giving incentives to reduce energy use, though the current prices are too cheap to make a difference. However, the current gas price hike is the equivalent of a carbon tax, of around \$600–\$950 a tonne, which will force consumers to reduce their usage, which in turn decreases the carbon allowance prices. On the other hand, the European countries that are most acutely suffering from a gas shortage are restarting their coal-fired plants, which would increase the demand for carbon allowances.”

The energy crisis is having a more obvious and direct effect on compliance markets, especially the EU ETS, as companies are obliged to shift their energy sources and their emissions while facing an economic squeeze, which will affect climate ambitions. Voluntary markets have reacted to the broader economic downturn. The strong expansion of 2021 has not continued into 2022, with prices generally dropping and inconsistently recovering.

The price risk of carbon emission allowances futures has shown volatility since the start of the energy crisis, reflecting market expectations over how the crisis would affect EU governments' propensity to decarbonise. The increased carbon price would encourage people to consume less energy. In this way, the energy crisis might be an opportunity to accelerate the energy transition and invest in projects reducing GHG emissions, which will reap rewards for investors.

Business model: Investing in carbon markets to reach net zero

The carbon market has numerous implications for financial firms and their clients. According to our interview data, asset management firms at various stages of creating net zero strategies have purchased carbon credits to operate on a climate-neutral basis for their Scope 1 and Scope 2 emissions and reported operational Scope 3 emissions. Offsetting is one of the most basic actions taken.

Carbon pricing also has an impact on capital costs, particularly in certain energy-intensive sectors subject to the compliance carbon market, and asset managers are currently **factoring carbon pricing into their investment portfolio models**. It also helps to better understand which companies are best positioned for the energy transition.

On the one hand, asset managers are investing in carbon markets (such as EU ETS derivatives) as part of their investment strategy, while developing capabilities to invest in assets capable of generating carbon offsets. On the other hand, as part of their decarbonisation strategy,

some heavy-emitting investors have already invested in carbon markets, raising carbon credit funds.

At the same time, carbon credits are used for more than just offsetting. Clients of financial institutions are becoming increasingly interested in investing in carbon markets through the purchase of carbon offsets or in underlying assets that generate offsets. The incentives are driven by the anticipation of higher future carbon pricing, as well as the need to hedge future carbon liabilities for those who are vulnerable. For example, airlines are subject to future offset obligations under [CORSIA](#). Overall, there is an increasing demand for high-quality credits from large-scale buyers, either for decarbonisation or as an investment strategy. In this context, carbon credit rating agencies, which provide third-party ratings to assure the high quality of credits, are gaining traction.

Opportunities and concerns regarding carbon offsets measurement

First, the investors and asset managers whom we surveyed agreed that, in the words of one manager, “Carbon markets vary substantially in terms of compliance vs. voluntary markets, across regions (e.g., [EU ETS](#) vs. [China CCER](#)), and [in terms of] types of credit (avoidance vs. removal, protect vs. restore), meaning there is limited standardisation in the market.”

The current carbon asset measurement system does not reflect the level of integrity that the industry and investors demand to maintain an effective and transparent carbon market. Instead, it includes a lack of pricing transparency, inadequate auditing and reporting quality, inconsistent credit type across regions, and transaction integrity issues.

Currently, carbon assets could be non-fungible for a variety of reasons. For example, there is no single trustworthy registry and exchange for carbon offsets among multiple nations at the regulatory level. At the data quality level, there is no real-time visibility of carbon offsets being sold and purchased, nor is there visibility of the whereabouts of these carbon offsets.

These challenges are particularly apparent in China, where industry insights coincide that there is no single trustworthy registry for high-integrity carbon credits given the varying standards and therefore non-fungibility of such carbon credits. At the same time, also in China, “the incidents of firms falsifying carbon data under the national ETS last year have raised concerns over the quality of data being submitted. Accurate and reliable data is essential for the effective and standardised operation of the ETS, and the Ministry of Ecology and Environment is working on new regulations to prevent data fabrication from the data submitted by companies.”

Several actions would be required to ensure transparency in the carbon market. First, although it would be challenging to standardise carbon projects with various features such as co-benefits, producing standardised carbon assets for similar projects to increase market liquidity is possible; [Climate Impact X in Singapore](#) is one example. Second, the issue of poor data quality in the carbon market must be addressed. Third a central UN-managed and open access registry can help to enable access to market information. For instance, to address this issue of lack of standardisation and coordination among registries and intermediaries, the World Bank has

launched its “Climate Warehouse” initiative, which will provide client countries with a meta-registry for carbon offsets, allowing more independent scrutiny.

Auditing and regulatory market infrastructure like exchanges are required to promote liquidity and trust to scale up VCMs across regions. As noted, climate disclosure guidance is being developed by some regulators (e.g., the SEC and EFRAG), and this will compel organisations to declare their usage of credits and the attributes of those credits with more transparency. However, reliable monitoring, reporting, and verification (MRV) systems are necessary.

Education and capacity building is also required for regions that do not yet have a carbon market. Regardless of whether carbon assets should be treated and regulated like other commodities, there will be no comparable trust or liquidity in them as long as they lack enforceable regulations, transparency of sale, purchase, ongoing monitoring, or retirement systems.

In the case of China, respondents agreed with the statement that “efforts are needed to improve data quality within the ETS, suggesting further monitoring of carbon emission verification reports, capacity building, and training for emission verifiers to enhance the market efficiency, and set up detailed guidelines and regulation needed to build a robust MRV system.”

Roles of regulation: What to anticipate and count on

Clearer accounting guidance and legislation would foster the development of a transparent carbon market. Carbon asset accounting standards are currently lacking in most of the jurisdictions we surveyed, although they are fast emerging. According to our poll, the most significant concern is a lack of transparency in the market, followed by unfaithful financial statements, obstacles to developing a carbon market, and the impact on carbon offsets’ product certification. For example, there is little consensus on how carbon offsets should be classified if they are kept as a financial or trading instrument. “Banks and corporations are having difficulty keeping these intangible assets on their books,” stated one asset manager.

Building a new carbon offset financial accounting paradigm: Suggestions from practitioners

Most industry respondents agreed that carbon offsets and related derivatives can be accounted for as a financial instrument that can be used for investment purposes in addition to carbon offsetting. However, until the barriers to both compliance and voluntary markets are addressed, the answer to this question will remain ambiguous. The repercussions of using a non-standardised financial accounting treatment can be substantial, in addition to pricing opacity, arbitrage risks, the inability to compare these financial instruments, and, ultimately, lower confidence and scaling of carbon markets. Some respondent suggestions for overcoming the obstacles included working together on the Integrity Council for the Voluntary Carbon Market (IC-VCM)²⁶ to standardise VCMs, involving industry players, and using a framework such as [Common Ground Taxonomy](#) to bridge existing measurement/valuation standards while working with organisations such as the IASB and the ISSB, rather than creating more new ones²⁷.

Concluding remarks from the industry

Common industry responses highlight the importance of classifying and presenting carbon offsets as investable assets, as long as the carbon assets' financial accounting and measurement and certifying obstacles are adequately resolved. Carbon markets can also help corporations achieve their net zero goals and might be instrumental in the transition finance process. For corporations, for example, carbon financial accounting and sustainability disclosure are linked; organisations must be held accountable for revealing their carbon footprint to achieve alignment on their net zero strategies, targets, and usage of carbon offsets.

Tighter regulation in the market infrastructure is required to ensure a high-integrity carbon market, beginning with standardised carbon measurement methodology and due diligence. For instance, when examining the outcomes of climate risk stress testing and overall financial services market demand for offsets, regulators should provide opinions on the VCM, on how they analyse offset types, and on the offset types' risks and pricing.

Finally, as one respondent noted, "Regulators who move early have an opportunity to define global standards and help organisations in their jurisdictions to best prepare for future global standards." Current work on international alignment of regulation is essential for interoperability and should be continued.

Carbon exchanges and registries must maintain high integrity to provide sufficient buffers and protections for participants in the case of substantial exchange disruptions or other platform hazards. Aligning disclosure with TCFD and ISSB recommendations, publishing the transition plan, and declaring the usage of carbon credits and activities are some possible solutions to consider.

6. A proposal for accounting recognition of carbon offsets

a. Carbon offsets are not exactly intangible assets or inventories

According to [IAS 2](#) paragraphs 6 and 8, inventories are defined as assets held for sale in the ordinary course of business; in the process of production for such sale; or in the form of materials or supplies to be consumed in the production process or the rendering of services. Inventories encompass goods purchased and held for resale, including, for example, merchandise purchased by a retailer and held for resale, or land and other property held for resale. Inventories also encompass finished goods produced or work in progress being produced by the entity and include materials and supplies awaiting use in the production process²⁸.

Carbon offsets as related to the business model of a financial entity **are not held for sale in the ordinary course of business as any other inventories**—that is, carbon offsets are managed more as derivatives or other financial instruments **and are not used in the production process and not to be consumed for any purpose**. They are used within the usual activity of the bank as offering financial instruments, access to customer markets, or hedging of clients' operations, and involve extending the current financial risk management expertise on emission rights.

Such offsets should be considered investable assets, as they are used in the transition finance towards net zero strategies for asset managers and banks' clients, or even raising unlisted or listed vehicles to scale up capital and liquidity for private carbon markets. Heavy industry emitters can purchase forward derivative contracts from financial institutions, locking in a supply of offsets for future emissions, or they can raise funds to invest in carbon credits and help their decarbonisation strategy.

Carbon offsets are a key tool of capital markets in the decarbonisation transition process and will be needed by most companies to address this risk, which is a transversal risk affecting every area of an entity. Traditional risks (i.e., credit, market, and liquidity risks) are affected by ESG factors and have implications on firm performance²⁹; therefore, carbon-related instruments can be used to mitigate these types of risks, in the same way traditional financial instruments are used.

Moreover, [IAS 38](#) paragraphs 8-17 define an intangible asset as an identifiable, non-monetary asset without physical substance. In addition, an intangible asset should only be recognised if its cost can be measured reliably, and future economic benefits that are attributable to the asset will probably flow to the entity. In the case of carbon offsets managed by a financial entity in the way explained above, **the benefits attributable to the asset do not flow to the entity since the entity enjoying the emissions/offset is in fact the client, not the bank**³⁰.

In this way, either of these two standards properly fits the faithful representation of what a carbon offset is and how it generates cash flows for the financial entity.

b. Searching for a definition of "financial instruments"

Under IFRS, a financial instrument is a contract that gives rise to a financial asset of one company and a financial liability or equity instrument of another entity (IAS 32.11). Today, a

spot carbon offset would not comply with the definition of a financial instrument in [IAS 32](#), and that is why it is accounted for as inventory or an intangible asset for now³¹.

Financial assets included in the “held for trading” category, and therefore, measured at fair value through profit or loss, are [financial instruments](#) that (a) are acquired or incurred principally to sell or repurchase them in the near term, (b) on initial recognition are part of a portfolio of identified financial instruments that are managed together and for which there is evidence of a recent actual pattern of short-term profit-taking, or (c) are a derivative. **Carbon offsets, as managed by a bank for its clients, meet this definition in full.** Thus, in our opinion, carbon offsets should be reported in the same balance sheet and profit and loss (P&L) account as the other underlying financial instruments that they are managed with.

Although emission allowances do not meet the current definition of financial instruments under IAS 32, [MiFID II classifies emission allowances](#), consisting of any units recognised for compliance with the requirements of Directive 2003/87/EC (Emissions Trading Scheme), as financial instruments under the aforementioned Directive (Annex I of Directive 2014/65/UE).

In light of the above regulatory approaches, we advocate for a **change in the standards to amplify the definition of a financial instrument or to develop a new category of instruments at fair value through an identifiable reported line item in the income statement** that would reflect **the real management and financial goals of financial entities** with these instruments.

c. Applying “fair value” criteria

It is important to distinguish between carbon offsets that a financial entity would buy on a forward basis for its own consumption (which are generally not significant for banks), and the ones that it holds to operate with clients. When the purpose of using these products is not for own consumption, these instruments are managed together with the derivatives related to them in a trading portfolio. This market is increasing rapidly, and great volumes of trade are expected. Therefore, the following two considerations are essential:

- The characteristics of these products and the development of these markets, where the bid/offer exchange is similar to a commodity trading exchange, creating price transparency at a global scale and allowing participants to market the value of carbon in their portfolio; and
- The way these products are managed by brokers/dealers (e.g., purchasing allowances primarily at a government auction on the European Energy Exchange, and hedging the position by selling futures on the ICE Index).

As explained above, based on the "faithful representation" principle embedded in any aspect of IFRS accounting, we think that **a good reporting on these products would be to include them among the financial instruments at fair value as separate reported line items both in the balance sheet and within the income statement**³².

In this regard, **EFRAG** already pointed out in its 2013 analysis³³ that [EUAs](#) are not consumed in the production process as this is the case with other assets classified as inventories; therefore, they could be considered as an alternative category of financial assets "held for

trading". Although an EUA does not strictly meet the definition of a financial asset, since it does not represent a right to receive cash from the entity that issues it, **it can, however, be exchanged in the cash market**, provided that the price is always known since **it is a liquid market**³⁴.

Likewise, EFRAG notes in the same analysis that when classifying the EUA, the underlying reasoning for an entity towards these assets is relevant: it should be aligned with the concept of the business model of IFRS 9 and should more faithfully represent the economic substance of the *Global Markets* business. That is, **if the entity intends to benefit from fluctuations in the price of the EUAs in the short term**, in the same way that it does with any other underlying financial instruments, **it might be appropriate to consider them as financial assets**. They are initially recognised at the acquisition price and subsequently at their fair value, collecting the changes in fair value in P&L.

7. Consumption of regulatory capital needs for incentives

a. What are the current capital requirements for banks?

The FRTB includes higher capital charges for carbon trading under the standardised approach to market risk³⁵, which has implications for banks in their role as intermediaries in the ETS.

[The FRTB will increase capital costs for banks participating in the carbon certificate market.](#) In particular, the following two aspects of the FRTB will increase capital costs:

- (i) **High risk weights of carbon certificates:** The FRTB treatment for carbon certificates allocates a standardised approach to the capital calculation that assigns a risk weight of 60% to carbon trading—among the highest of all commodities (e.g., twice that of crude oil).
- (ii) **Penalisation of carry positions:** Netting is not possible, meaning buying a spot and selling forward entails a capital charge. In addition, the treatment of carry positions penalises banks through capital charges due to the correlation applied between spot and forward.

It is, therefore, also crucial to assess whether the tightening of financial regulation for carbon certificates is justified from a risk perspective—that is, whether it is proportional to the underlying risk of trading carbon certificates.

In conclusion, the current high capital charges could impede the ability of banks to act as intermediaries in carbon credits certificate markets, hindering their role in renewable energy and transition finance³⁶.

Carbon banking book positions

A specific regulatory treatment regarding carbon offsets has not been defined yet, and **the accounting classification will impact the associated prudential treatment**. It is for this reason that we urge the development of proper accounting regulation as soon as possible.

Today, the accounting standards remain as follows:

- Intangible assets are deducted 100% from a prudential perspective.
- Inventories have no specific risk weight applied to them, so we should consider them as an "other item" exposure class and assign the corresponding risk weight of 100%.

Both capital treatments are penalising and would be a clear disincentive for these markets. In short, from our perspective, the current accounting standards are increasing regulatory capital requirements for banks, rowing against the current of global decarbonisation objectives and hindering entities' transition.

b. The role of banking supervisors and regulatory capital incentives

Banking regulators, as part of their supervisory role, should effectively monitor and observe banking practices and operations while preserving long-term stability and resilience for the whole financial system. Accordingly, regulators should support banks in facilitating a smooth and safe transitory process for new financing instruments and contracts³⁷.

Carbon offsets, developed with market efficiency through capital markets, offer one solution for this safe transition without compromising the bank's credit exposure, capital adequacy, and/or financial stability.

In this context, we encourage international regulators, supervisors, and policymakers to review the definition of financial instruments applied to carbon offsets accounting, offsets' assessment, and their impact on risk-weighted assets and capital management for financial institutions.

There might be implications on financial stability as well as incentives for regulatory capital adequacy and an alignment with economic capital. The point is that the current accounting treatment for these new financial instruments will generate capital requirements for global banks as it is now, or will require banks to manage capital through add-ons in their Pillar 2 capital.

This prudential treatment of capital requirements should be a priority to secure market integrity and avoid market fragmentation and regulatory capital arbitrage in carbon offsets markets.

8. Policy recommendations

- Create a new specific standard in financial accounting for carbon offsets and/or revisit the definition of financial instruments to classify carbon offsets as investable assets.
- Foster the Sustainability Standards Initiative to promote better disclosure and to tackle the financial accounting impact as a priority.
- **Amplify the definition of a financial instrument for carbon offsets** to align with [MiFID II](#)³⁸ **or develop a new category of financial instruments at fair value** with a specific reported line to be recorded in the income statement, reflecting the business model of the financial firm (whether this is a bank, an asset manager, or a corporate).

- Improve the assessment of capital charges for carbon certificates based on the correlation observed for EU allowances (EUAs), alongside the [ISDA proposal for correlations of “carry positions”](#) between the spot and forward for carbon certificates. Doing so might imply an almost 40% reduction in the capital charge of carbon certificates³⁹.

These urgent recommendations will help policymakers to close the loop between sustainability information and financial statements, by which carbon offsets should be assessed and reflected within the financial statements; this implies presenting such standard sustainability information from different accounting-related regulatory frameworks that prioritise transparency and integrity.

Finally, regulators of financial institutions should consider a robust assessment of market volatility and risks underlying these financial instruments and derivative instruments as implied. The suggested assessment of capital charges for carbon offsets and the consideration of a financial accounting for this new asset class are critical, since the result has a direct impact on capital requirements affecting banks, insurance companies, and investors through risk weights.

9. Conclusion

The IFRS do not explicitly address the financial accounting for carbon offsets, and currently, there is neither a specific financial accounting definition for these offsets nor clear, complete regulation on how to account for them.

The evolving global carbon markets, global energy security, and energy transition raise calls to regulators and policymakers to either develop clear, detailed rules for accounting for carbon offsets or amplify the definition of the financial instrument in this context. In other words, a new international accounting standard is needed for carbon offsets, reflecting them in the financial statements with a fair value approach and with a new definition and understanding of financial instruments for carbon markets.

It is critical that the IASB, as the accounting standard-setting board of the IFRS Foundation, retakes the Emissions Project and provides clear and consistent guidance on their accounting. Although the IFRS Foundation has made a significant effort to set up the ISSB, and the work that the ISSB currently does to issue new guidelines in the space of sustainability is of great value, there is still a need for this project to be prioritised to develop global sustainable standards, which will be upheld by the IASB.

Further, the risk weight for carbon certificates under the standardised approach to market risk is too high and disproportionately penalises carbon credit trading. The FRTB needs to be reviewed and revised to align with the EU and ISDA recommendations to assess the risk weight for these trades.

To delay addressing these issues threatens a cost-effective transition to carbon neutrality, due to high capital charges that could prevent banks from acting as intermediaries in the global carbon markets trading; this is something that should be addressed by policymakers.

As of April 2022, the IASB has decided to add a project on “[pollutant pricing mechanisms](#)” to its reserve list of projects (i.e., those that could be added to the work plan only if additional capacity becomes available). But there is no imminent project to address these issues.

We therefore encourage the IFRS to address the accounting for GHG emission rights as a priority to foster transparency in capital markets and financial statements, enabling investors, corporates, and financial institutions to work with integrity and market efficiency.

We conclude with an overview of the two main benefits of improved carbon offset financial accounting: more accurate standards and greater synergies.

a. A new standard for new financial products

The world is evolving towards a rapid sustainable transition while new instruments are being developed to deal with this evolution. In the case of carbon offsets, current accounting standards do not deal properly with the characteristics of these new products, leading to a substantial diversity in current business practices across many sectors while promoting a lack of relevant, transparent, and comparable reporting systems (i.e., financial and non-financial information).

In our opinion, the evolving carbon offsets market in the context of capital markets and this new (emerging) global situation raise urgent calls to regulators and policymakers to develop comprehensive and detailed carbon financial accounting and financial standards and/or adapt the existing ones.

We advocate for a change in the current financial reporting standards and accounting treatments to amplify the definition of a financial instrument or to develop a new category of instruments at fair value through the income statement that reflects the real management and financial goals of financial entities with these instruments.

b. Synergies with recent sustainability disclosure projects

We emphasise the importance of closing the loop between sustainability information and financial statements. Synergies are clear as each piece of information relies on the same events, hypotheses, estimates, and principles. Hence, information from different accounting-related regulatory frameworks must be coherent, homogeneous, and transparent. If carbon offsets are not well represented and identified in the financial statements, such association and synergy cannot be achieved.

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10. Glossary

Carbon offset	An emissions unit issued by a carbon crediting programme that represents an emission reduction or removal of a greenhouse gas emission. Carbon offsets are uniquely serialised, issued, tracked, and cancelled using an electronic registry.
CCM	Compliance carbon market
CEA	China Emission Allowance traded in China's national emissions trading scheme (ETS).
Certified carbon offset	Certified carbon offset credits are carbon offsets that take the form of transferable or tradable instruments, certified by governments or independent certification bodies, representing the removal of emissions of one metric tonne of CO ₂ , or an equivalent amount of other GHGs
COP	The Conference of the Parties
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
EFRAG	The European Financial Reporting Advisory Group
ESG	Environmental, social, and governance
ETS	Emissions trading system; more specifically, EU ETS is the European Union Emissions Trading Scheme.
EUA	European Union Allowance
FRTB	The Fundamental Review of the Trading Book
GHG	Greenhouse gas. The seven greenhouse gases listed in the Kyoto Protocol are carbon dioxide; methane; nitrous oxide; hydrofluorocarbons; nitrogen trifluoride; perfluorocarbons; and sulphur hexafluoride.
HKEX	Hong Kong Exchanges and Clearing
IASB	The International Accounting Standards Board
IFRS	International Financial Reporting Standards
IFRS Foundation	The International Financial Reporting Standards Foundation
ISDA	The International Swaps and Derivatives Association
ISSB	The International Sustainability Standards Board
MICO_{2e}	Million tonnes of carbon dioxide equivalent emissions
MiFID	Markets in Financial Instruments Directive (2004/39/EC)
MRV	Measurement, reporting, and verification
Scope 1 emissions	Direct greenhouse gas emissions that occur from sources that are owned or controlled by an entity.
Scope 2 emissions	Indirect greenhouse gas emissions that occur from the generation of purchased electricity, heat or steam consumed by an entity.
Scope 3 emissions	Indirect emissions outside of Scope 2 emissions that occur in the value chain of the reporting entity, including both upstream and downstream emissions.
SEC	The U.S. Securities and Exchange Commission
TCFD	The Taskforce on Climate-related Financial Disclosures
VCM	Voluntary carbon market

ANNEX

ANNEX I - Questionnaire for gaining industry insights (open-ended questions)

1. Considering the context of the current energy crisis

- Do you think it could affect the carbon markets?
- If the answer is yes, how would it be affected?

2. Business models in the context of carbon markets

- How do carbon markets impact your firm's business model?
- How do carbon credits add value to your firm's business model and clients?

3. Transparent and faithful accounting representation

- Do you think current carbon markets accounting reflects transparency, accuracy, and standardised transactions in carbon credits?
- If the answer is no, what measures would be needed to achieve such transparency in the market?

4. What accounting regulation can we currently count on to account for carbon assets?

- In your jurisdiction, is there a specific accounting regulation for carbon assets?
- If the answer is yes, what are the key challenges / existing gaps concerning other accounting treatments? (If possible, include practical examples.)
- Do you think policymakers and regulators must take it seriously and urgently to tackle a framework for accounting in carbon markets?
- What do you think are the implications of such a lack of harmonised accounting practices in a global context? Rank from 1 to 4 in order of importance:
 - a) Lack of transparency.
 - b) Unfaithful financial statements.
 - c) Obstacles in developing carbon markets.
 - d) Impact on certification of carbon assets.
- Do you think the existence of a global accounting standard for carbon assets would help to achieve the objectives of transparency in the market?

- If the answer is yes, what institution, in your view, would be able to lead the new accounting framework?
- What are your views regarding the new IASB "reserve list" project for emissions trading schemes? In your opinion, should the IASB prioritise this project over other projects?

5. A new standard for a new paradigm: Our Proposal for accounting recognition of carbon assets

- What are the consequences of applying a non-standardised financial accounting treatment for carbon assets based on the above?
- How do you think regulators and international standard setters can overcome this obstacle?
- What are your main recommendations for the treatments and disclosure, in line with your business model and existing engagements, regarding the following? Rank from 1 to 6 in order of relevance.
 - a) Carbon assets.
 - b) Financial instruments.
 - c) Fair value.
 - d) Regulatory capital incentives.
 - e) Disclosure and financial reporting
 - f) Innovative instruments: crypto assets and blockchain tech.
- Do you think carbon assets could meet the necessary conditions to be considered "financial instruments" from an accounting point of view?
- If the answer is no, what is the main obstacle in your view?

6. Conclusion

- What are your general insights for the future development of carbon accounting standards and sustainability disclosure?
- Any additional policy recommendations to suggest for banking regulators?

ANNEX II – China’s carbon markets

Overview of the carbon market and carbon asset accounting in China

Mainland China

China's national ETS completed its first full compliance cycle in 2021, with a recorded compliance rate of 99.5%, and the country now has the world’s largest carbon market. In its first compliance cycle, China's ETS, launched in 2021, covers 2,162 power companies across the country, accounting for more than 30% of total emissions in China⁴⁰. In the next one to two years, seven more heavy-emitting sectors are expected to be introduced. Besides ETS, eight regional pilot carbon markets are not linked to each other or ETS directly at the transaction level. The voluntary carbon market, on the other hand, has acted as a bridge, allowing China Certified Emissions Reductions (CCERs) to be used to offset certain emissions quota in all carbon markets. China began issuing CCERs in 2012 and abruptly shut down the floodgates in 2017. As a result, all CCERs sold in the market presently are stockpiled credits issued before 2017, and a new issuance mechanism is expected to be reopened to help China meet its emission reduction targets.

Hong Kong

The carbon market in mainland China has not yet covered Hong Kong; yet Hong Kong has continued to foster its role as a cross-border carbon market gateway.

The Hong Kong Monetary Authority established the Green and Sustainable Finance Cross-Agency Steering Group (CASG) in 2020. Recently, the Carbon Market Workstream was established under CASG, co-chaired by the Securities and Futures Commission and HKEX. The authorities have placed a strong emphasis on taxonomies and sustainability reporting standards. From a financial accounting standpoint, Hong Kong's distinct strength is its proximity to mainland China, and its familiarity with both mainland and international standards positions it to facilitate global capital flow into China's domestic carbon market and potentially build a carbon market.

Compliance carbon market in China	Year of launch	Instruments	Category	Cap
China’s ETS	2021	CEAs, CCER	National	4500 MtCO ₂ e (2021)
Beijing	2013	CCER, Beijing Allowance	Regional	~35 MtCO ₂ e (2021)
Tianjin	2013	CCER, Tianjin Allowance	Regional	120 MtCO ₂ e (2020)
Shanghai	2013	CCER, Shanghai Allowance	Regional	105 MtCO ₂ e (2020)
Guangdong	2013	CCER, Guangdong Allowance	Regional	265 MtCO ₂ e (2021)
Shenzhen	2013	CCER, Shenzhen Allowance	Regional	31.5 MtCO ₂ e (excluding buildings, 2015)
Hubei	2014	CCER, Hubei Allowance	Regional	166 MtCO ₂ e (2020)
Chongqing	2014	CCER, Chongqing Allowance	Regional	78.39 MtCO ₂ e (2020)
Fujian	2016	CCER, Fujian Allowance	Regional	~126 MtCO ₂ e (2020)

Source: <https://icapcarbonaction.com/en/ets>

Carbon asset accounting in China

China is a significant carbon market by size, but also a potential powerhouse for many nature-based solutions. According to the World Bank's carbon pricing report in 2022, around 70% of these credits were generated in Asia, primarily in Cambodia, Indonesia, and China. Therefore, establishing a carbon asset accounting system that integrates well with the financial accounting system would be critical to scaling China's carbon market.

The size of China's carbon market is immense, although it is still in its early phases, making it more challenging to adopt a consistent carbon asset accounting system and integrate it with international standards. **China has stated a timeframe for the development of its carbon emissions accounting system at various levels but has not yet specified a timetable for carbon asset accounting.** President Xi announced China's "1+N" climate policy framework at COP15 in March 2021, and two key documents⁴¹ were released in October to mark its formal launch⁴². Although no specifics on carbon asset accounting have been mentioned in the policy, the establishment of a carbon accounting system at corporate and product levels has been proposed for consideration. The most recent plan from the National Development and Reform Commission lays out tasks from top to bottom. As a result, four tasks have been delegated: establishing national and local carbon emissions accounting systems, improving industrial enterprise carbon emissions accounting mechanisms, establishing key product carbon emissions accounting methods, and establishing a national greenhouse gas inventory production mechanism. More progress, particularly on the carbon asset accounting system, is to be expected.

Challenges

Building a unified carbon asset accounting system in China is difficult. To begin with, the regulatory body for carbon accounting is still unclear. A taxonomy of carbon assets is not specified. Financial institutions have yet to directly participate in either the China's national ETS. Due to the magnitude of the market, implementing a carbon asset accounting system would be challenging without standardised procedures and platforms. Finally, while China may build its carbon asset accounting system, harmonisation with the international carbon asset accounting system is essential to establish a credible domestic carbon market that encourages market participation outside of China.

The way forward

Cross-border approaches to carbon asset accounting will remain a focus of global debate, with accounting playing an important role in establishing a common ground among varied carbon market regimes. Although China's carbon market is still in its early stages, it is confronting the very same challenges as many other jurisdictions trying to participate in a global carbon market or establish a credible domestic carbon market.

References

- ¹ See the Exposure Draft IFRS S2 Climate-related Disclosures website at <https://www.ifrs.org/content/dam/ifrs/project/climate-related-disclosures/issb-exposure-draft-2022-2-climate-related-disclosures.pdf>
- ² See the Sustainability-related Reporting at the IFRS website at <https://www.ifrs.org/projects/completed-projects/2021/sustainability-reporting/>
- ³ See IFRS 13 Fair Value Measurement in its 9 paragraph at [IFRS - IFRS 13 Fair Value Measurement](#)
- ⁴ See EBA final draft standards on key areas for the EU implementation of the FRTB (European Banking Authority) at [EBA publishes final draft standards on key areas for the EU implementation of the FRTB | European Banking Authority \(europa.eu\)](#)
- ⁵ See [ISDA](#) Implications of the FRTB for Carbon Certificates – International Swaps and Derivatives Association (isda.org)
- ⁶ Rosales R, Bellino P, Elnahass M, Heubaum H, Lim P, Lemaistre P, Siman K, & Sjogersten S. (2021). Voluntary Carbon Markets in ASEAN: Challenges and Opportunities for Scaling Up. Imperial College London [Green Finance COP26 Universities Network Policy Report.pdf \(publishing.service.gov.uk\)](#)
- ⁷ See the IFRS Foundation website at [IFRS - Home](#)
- ⁸ See the International Sustainability Standards Board website at [IFRS - International Sustainability Standards Board](#)
- ⁹ Carbon trading: Exponential growth on record high (2022) Refinitiv Perspectives. [Online at: https://www.refinitiv.com/perspectives/market-insights/carbon-trading-exponential-growth-on-record-high/](https://www.refinitiv.com/perspectives/market-insights/carbon-trading-exponential-growth-on-record-high/)
- ¹⁰ Hub, I.I.S.D.S.D.G.K. Trading begins under China's National ETS: News: SDG knowledge hub: IISD, SDG Knowledge Hub. IISD. [Online at: https://sdg.iisd.org/news/trading-begins-under-chinas-national-ets/](https://sdg.iisd.org/news/trading-begins-under-chinas-national-ets/)
- ¹¹ See the Iseg website at [Voluntary Carbon Market | London Stock Exchange](#)
- ¹² See the Carbon Credits website at <https://carboncredits.com/london-stock-exchange-vcm-platform/>
- ¹³ See South Pole website at [Carbon credits | Buy carbon credits or offset you carbon footprint | South Pole, and A Guide on Carbon Credit Accounting and Reporting Net Zero \(carboncredits.com\)](#)
- ¹⁴ Rosales R, Bellino P, Elnahass M, Heubaum H, Lim P, Lemaistre P, Siman K, & Sjogersten S. (2021). Voluntary Carbon Markets in ASEAN: Challenges and Opportunities for Scaling Up. Imperial College London [Green Finance COP26 Universities Network Policy Report.pdf \(publishing.service.gov.uk\)](#)
- ¹⁵ Kennelly, C., Berners-Lee, M., & Hewitt, C. N. (2019). Hybrid life-cycle assessment for robust, best-practice carbon accounting. *Journal of cleaner production*, 208, 35-43.
- ¹⁶ See the IFRS website at [IFRS - IAS 8 Accounting Policies, Changes in Accounting Estimates and Errors](#)
- ¹⁷ See the IFRS website at [IFRS - Who uses IFRS Accounting Standards?](#)
- ¹⁸ Wen, L., & Li, Z. (2020). Provincial-level industrial CO2 emission drivers and emission reduction strategies in China: Combining two-layer LMDI method with spectral clustering. *Science of the Total Environment*, 700. DOI: <https://doi.org/10.1016/j.scitotenv.2019.134374>

-
- ¹⁹ Wu, X. D., Guo, J. L., Li, C., Chen, G. Q., & Ji, X. (2020). Carbon emissions embodied in the global supply chain: Intermediate and final trade imbalances. *Science of the Total Environment*, 707, <https://doi.org/10.1016/j.scitotenv.2019.134670>
- ²⁰ Roussanaly, S., Berghout, N., Fout, T., Garcia, M., Gardarsdottir, S., Nazir, S. M., ... & Rubin, E. S. (2021). Towards improved cost evaluation of Carbon Capture and Storage from the industry. *International Journal of Greenhouse Gas Control*, 106, 103263.
- ²¹ Rosales R, Bellino P, Elnahass M, Heubaum H, Lim P, Lemaistre P, Siman K, & Sjoergersten S. (2021). Voluntary Carbon Markets in ASEAN: Challenges and Opportunities for Scaling Up, Part III. Imperial College London [Green Finance COP26 Universities Network Policy Report.pdf \(publishing.service.gov.uk\)](#)
- ²² Palea, V., & Drogo, F. (2020). Carbon emissions and the cost of debt in the eurozone: The role of public policies, climate-related disclosure and corporate governance. *Business Strategy and the Environment*, 29(8), 2953-2972.
- ²³ Alsaifi, K., Elnahass, M., & Salama, A. (2020). Carbon disclosure and financial performance: UK environmental policy. *Business Strategy and the Environment*, 29(2), 711-726.
- ²⁴ Counterpoint global insights crypto and carbon (2022) - Morgan Stanley. Online at: https://www.morganstanley.com/im/publication/insights/articles/article_cryptoandcarbon_us.pdf
- ²⁵ Building the potential of blockchain in voluntary carbon markets (2022) Grantham Research Institute on climate change and the environment. Online at: <https://www.lse.ac.uk/granthaminstitute/news/building-the-potential-of-blockchain-in-voluntary-carbon-markets/>
- ²⁶ See the "The Integrity Council for the Voluntary Carbon Market" website at [ICVCM - Build integrity and scale will follow](#)
- ²⁷ International Platform on Sustainable Finance, Common Ground Taxonomy – Climate Change Mitigation, European Commission (2022). Online at: https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/220603-international-platform-sustainable-finance-common-ground-taxonomy-instruction-report_en.pdf
- ²⁸ IAS 2 paragraphs 6 and 8. <https://www.ifrs.org/issued-standards/list-of-standards/ias-2-inventories/>
- ²⁹ Alsaifi, K., Elnahass, M., & Salama, A. (2020). Carbon disclosure and financial performance: UK environmental policy. *Business Strategy and the Environment*, 29(2), 711-726.
- ³⁰ See the IFRS website at [IFRS – IAS 38 Intangible Assets](#)
- ³¹ See the IFRS website at [IFRS – IAS 32 Financial Instruments: Presentation](#)
- ³² Measuring the fair value of unquoted equity instruments within the scope of IFRS 9 Financial Instruments (2013). IFRS Foundation. Online at: <https://www.ifrs.org/content/dam/ifrs/supporting-implementation/ifrs-13/education-ifrs-13-eng.pdf>
- ³³ Draft comment paper – Emission trading schemes (April 2013) – EFRAG. Online at: ["Emissions Trading Schemes, Draft Comment Paper April 2013"](#)
- ³⁴ See the EU Emissions Trading System (EU ETS) website at: https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en

³⁵ Minimum capital requirements for market risk (2019) The Bank for International Settlements. BIS. [Online at: https://www.bis.org/bcbs/publ/d457.htm](https://www.bis.org/bcbs/publ/d457.htm)

³⁶ Implications of the FRTB for carbon certificates: A global perspective International Swaps and Derivatives Association (2022), ISDA. [Online at: https://www.isda.org/2022/04/21/implications-of-the-frtb-for-carbon-certificates-a-global-perspective/](https://www.isda.org/2022/04/21/implications-of-the-frtb-for-carbon-certificates-a-global-perspective/)

³⁷ Elnahass, M., Trinh, V. Q., & Li, T. (2021). Global banking stability in the shadow of the Covid-19 outbreak. *Journal of International Financial Markets, Institutions and Money*, 72, 101322.

³⁸ See the esma (European Securities and Markets Authority) website at [MiFID II \(europa.eu\)](https://www.esma.europa.eu)

³⁹ See Implications for FRTB for Carbon Certificates [Microsoft Word - FRTB_and_carbon_certificates_final_version \(isda.org\)](https://www.isda.org/2022/04/21/implications-of-the-frtb-for-carbon-certificates-a-global-perspective/)

⁴⁰ See the announcement regarding the compliance period for ETS in China, Ministry of Ecology and Environment of the People's Republic of China (2021). Online at: https://www.mee.gov.cn/ywgz/ydqhbh/wsqtz/202112/t20211231_965906.shtml

⁴¹ [\(Working Guidance for Carbon Dioxide Peaking and Carbon Neutrality in Full and Faithful Implementation of the New Development Philosophy](#) ("Overarching Guidance") issued by the CPC Central Committee and the State Council, and [the Action Plan for Carbon Peaking Before 2030](#) issued by the State Council ("2030 Peaking Plan"))

⁴² Action plan for carbon dioxide peaking before 2030, National Development and Reform Commission (NDRC) People's Republic of China (2021). Online at: https://en.ndrc.gov.cn/policies/202110/t20211027_1301020.html#:~:text=By%202030%2C%20the%20share%20of,carbon%20dioxide