

Role of Financial Players in the Indian Carbon Market

Learning from Existing Markets and Stakeholder Perspectives

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Executive summary

Given the size of India's economy and the scale of its emissions, the Indian Carbon Market (ICM) is expected to evolve into one of the world's largest compliancebased carbon trading markets. The question of whether financial players should be included in the compliance market driven by the Carbon Credit Trading Scheme (CCTS, a mechanism within the framework of ICM) requires considerable discussion. This brief discusses the potential role of financial players in the CCTS (compliance) based on a literature review and a stakeholder discussion organised by the Council on Energy, Environment, and Water (CEEW) on this issue. The stakeholder discussion took place in August 2023 at the CEEW Office in New Delhi. We highlight that financial players play a critical role in enhancing market functions – they provide financial intermediation for efficient capital allocation, ensure effective price discovery of underlying assets, and develop financial instruments like forwards, futures, options and swaps that permit risk transfer. These essential market functions help companies make informed carbon trading–related decisions and drive in-house mitigation.

We discuss the role of three broad groups of financial players (hedgers, speculators and arbitrageurs) along with the four major categories of financial institutions (banks, institutional investors, asset management companies and commodity trading houses) and instruments (derivatives and trading platforms) that impact carbon markets and the opportunities and challenges associated with their inclusion in carbon markets.

We then present key questions and concerns of relevant stakeholders that relate to: should financial players be allowed in the ICM and if so then what should be the right timing of this inclusion?; what are the critical lessons to be learnt in this regard from existing markets like REC and PAT?; and what are the learning from international markets that ICM could incorporate?

Finally, we also highlight that the inclusion of financial players can lead to increased price volatility, bubble formations, and market manipulation. Despite the risks, we emphasise that it is critical for the CCTS (compliance) to include financial players, considering the market-making role they can play. However, adequate safeguards must be established through monitoring and regulation to ensure that financial players do not take undue advantage of the market through market manipulation activities. The question that remains should not be 'if' financial players should be included in the market, but rather, 'when' this should happen. As a rule of thumb, the sooner, the better.

1. Introduction

In June 2023, the Government of India created the Indian Carbon Market (ICM) by notifying the Carbon Credit Trading Scheme (CCTS), which established the carbon trading structure and framework in India. The CCTS establishes guidelines for Indian players to track and trade carbon credits and charts the way forward for establishing a voluntary carbon market (baseline-andcredit system) and a compliance carbon market (capand-trade system) in India (Singh and Chaturvedi 2023). A carbon market commodifies greenhouse gas (GHG) emissions by one tonne of CO2e. This commodity can then be traded in various market forms, each serving distinct purposes (Singh and Chaturvedi 2023). Carbon trading is being adopted across many jurisdictions as it reduces the overall cost of mitigation to achieve a given emission reduction target.

The CCTS (compliance) established an intensitybased cap-and-trade system, wherein obligated entities producing excess emissions must purchase carbon credits to comply with notified greenhouse gas emissions intensity targets. In contrast, entities that are able to reduce their greenhouse gas emissions intensity beyond the target will receive carbon credit certificates (CCCs), which they can sell to entities failing to meet the target. Importantly, though carbon units are called CCCs in the CCTS, theoretically, they are still allowances¹ that are distributed based on emissions intensity.

Several countries worldwide are now developing capand-trade and offset markets and are simultaneously engaging in international instruments such as the United Nations Framework Convention on Climate Change's (UNFCCC) Article 6 mechanism. Globally, the trade of carbon dioxide (CO₂) permits reached an all-time high of EUR 881 billion in 2023, with over 12.5 billion metric tons of carbon permits changing hands. A significant portion of this value, approximately 87 per cent, was traded on the European Union Emissions Trading System (EU ETS), totalling EUR 770 billion (Twidale 2024). Meanwhile, carbon markets in North America, such as the Western Climate Initiative and the Regional Greenhouse Gas Initiative, experienced record prices in 2023, hitting USD 39/ton and USD 15/ton in their respective regional markets (Twidale 2024).

In addition to these established markets, the voluntary carbon market allows entities to buy carbon credits to offset emissions. Despite economic challenges, this market is expected to reach USD 3 billion by the end of 2024 (George 2024). Research suggests that by 2030, this market will expand and reach a value ranging from USD 10 billion to USD 40 billion (Reuters 2023).

One such key consideration for carbon market regulators is the potential role of financial players in these markets. Different jurisdictions have taken varied approaches,

As India gears up for the launch of the ICM, it is critical to deliberate on the different design aspects of an efficient carbon market.

^{1.} The CCTS (compliance) is based on an emissions intensity target approach rather than an absolute emissions mitigation target approach, given India is a fast-growing economy. 'Allowances' is a generic term used for one tonne of carbon dioxide reduction in absolute terms as practiced in absolute emissions mitigation-based cap-and-trade systems (e.g., EU ETS). The discussion here uses the term allowance to describe the general mechanics of an absolute emissions reduction target-based cap-and-trade system to communicate some key concepts that are also relevant for the emissions intensity-based CCTS (compliance). Even if the unit in terms of target-setting for the CCTS is intensity-based as against absolute targets, the way markets operate is similar (assuming everything else is constant), with the same demand and supply fundamentals driving carbon prices and market participant behaviour. All the learnings from allowance-based systems that have been discussed throughout this brief are equally applicable for the CCTS as well.

with some including financial players and others excluding them. For instance, the EU ETS defines carbon allowances as financial assets and has allowed the inclusion of financial players from the start. However, the Korean ETS was reluctant to take this step in its beginning phases. Both systems have been successful in achieving their decarbonisation goals. However, to understand the importance of financial players in carbon markets, it is essential to look at these examples more closely and understand their nuances.

In this issue brief, we discuss the role of financial players in the carbon market, focusing on the emissions trading system (ETS). We outline the initial concerns and questions of the relevant stakeholders based on a literature review and a stakeholder discussion organised by CEEW.

2. Role of financial players and markets in the economy

2.1 Financial intermediation for efficient capital allocation

Financial institutions and players facilitate the flow of savings from households to critical investment projects that drive economic development. A wellfunctioning financial ecosystem builds trust among people, encouraging them to channel their savings into institutions offering reliable returns. In contrast, inefficient financial markets erode confidence, leading individuals to hoard cash or invest in tangible commodities like gold, eventually undermining long-term economic growth and stability. Therefore, policymakers must carefully consider taxes, interest rates, transparency, and system resilience to foster an efficient financial environment.

Financial sector is critical for the development of any economy. There are three major roles that financial players play in the market - financial intermediation, price discovery, and risk hedging.

2.2 Effective price discovery of underlying assets

The prices of assets, such as stocks, bonds, or commodities, are determined by analysing complex information. The information that is most relevant varies by asset class, e.g., the information that determines the price of a stock is different from that which determines the price of a commodity. Given the complexity involved in collating and analysing the relevant information, buyers and sellers (e.g., a steel company and a project developer, respectively, in the case of carbon markets) are not well placed to forecast the price of an asset - a critical piece of information for their decision-making. This role is best played by financial players who are experts in this domain. By actively participating in trading activities, financial players contribute to the price discovery of assets. Moreover, their actions in the market generate price signals that enhance overall information discovery, benefitting all market participants.

2.3 Risk hedging

Financial instruments such as derivatives play a crucial role in managing the risks associated with future fluctuations in the price of assets. Derivatives are contracts with fixed terms that allow parties to trade a specified volume of a commodity at a predetermined price and time. Initially used in agriculture, derivatives were used to shield farmers and buyers from potential price risks. The different types of derivatives that are used in financial markets include futures, forwards, options, and swaps. These derivatives have been briefly discussed here (Hull 2012).

i) Forwards

A forward contract is a simple agreement between two parties to buy or sell an asset at a set price on a future date. It is different from buying something immediately (like in a spot contract). These contracts are usually made directly between parties, like companies, financial institutions, banks, or individuals. For instance, a construction company might enter into a forward contract with a steel supplier to buy steel at a fixed price in one year to mitigate the risk associated with potential price changes.

ii) Futures

Similar to a forward contract, a futures contract is a mutual agreement involving two parties to buy/sell an asset at a predetermined future date and price. However, unlike forwards, futures are traded on organised exchanges with standardised terms, and a clearing house ensures that the parties fulfil their commitments. For example, an oil producer can agree to sell 100 barrels at USD 70 each in three months on a commodities exchange with set terms and conditions, using a futures contract to protect against risks associated with declining prices.

iii) Options

Options are a type of financial instrument that can be traded in either organised exchanges or over-thecounter (OTC) markets. There are two primary types: calls and puts. With a call option, the holder secures an opportunity to purchase an asset at a certain price (referred to as the exercise or strike price) before a certain date (the expiration date), although it is not an obligation. On the other hand, a put option gives the holder the right to sell an asset at a predetermined price by a specified date. Unlike futures or forwards, where one is bound to buy or sell the asset, options offer greater flexibility; however, parties must pay a premium fee for this right. For example, Company A enters into an options contract agreeing to purchase 10,000 carbon credits at a given price over two years. However, due to considerable improvement in abatement technologies, Company A's emissions reduced notably in the specific time period, requiring the company to purchase only 8,000 carbon credits to meet the compliance target. Under the prerogative of an options contract, Company A has the right to invoke the 'put option', which will not obligate Company A to purchase the remaining 2,000 carbon credits.

iv) Swaps

A swap is a derivative agreement wherein a party can exchange or swap the values or cash flows associated with two different assets. This transaction typically involves two cash flows: one of which is constant or fixed, while the other varies based on factors such as the index price, interest rate, or currency exchange rate. Unlike options and futures, which are publicly traded on established exchanges, swaps are privately negotiated contracts and traded in the OTC market. For instance, assume a company in India needs dollars, while a US company needs rupees. They can enter into a currency swap to exchange these currencies directly, without involving banks, and therefore, avoid additional costs. These players can be broadly categorised into three groups: hedgers, speculators, and arbitrageurs.

2.4 Hedgers

Hedgers aim to minimise risk by reducing their exposure to fluctuations in asset prices. They achieve this by taking positions in the derivative market that offset potential risks. By doing so, they protect themselves against adverse price movements. For instance, energy companies typically use futures or options contracts to lock in the price of carbon credits, ensuring predictable compliance costs for obligated entities.

2.5 Speculators

Speculators engage in derivative markets to profit from predicting changes in asset prices. They are high risk– taking individuals or institutions who take strategic positions based on market forecasts. Unlike hedgers, their focus is not on minimising risk but on maximising returns. They rely on market trends, such as changing consumer preferences, interest rate fluctuations, and economic growth indicators, to inform their choices. Speculators often seek to diversify their portfolios and achieve significant profits in a short period. For example, since the primary objective of hedge funds and investment banks is to maximise returns for their investors, they tend to be open to taking risks in carbon markets by taking long or short positions as and when required to benefit from price volatility.

2.6 Arbitrageurs

Arbitrageurs operate in fast-paced environments, making quick decisions based on real-time market information. They profit by exploiting the price differences between the cash and derivatives markets. When a stock's price in the cash market is lower or higher than in the derivatives market, arbitrageurs

In financial markets, different players trade derivative instruments for varying reasons. capitalise on these differences for profit. Their actions enhance market liquidity and contribute to its overall efficiency. For example, commodity traders excel as arbitrageurs since they can leverage their knowledge of different markets by identifying opportunities across different carbon markets and borders in real time.

3. Carbon as a commodity

Carbon markets share certain characteristics with commodity markets. Carbon allowances function as commodities in carbon markets because they are standardised, interchangeable units that can be bought and sold on exchanges and OTC platforms. Both commodities and allowances rely on standardised contracts and various financial instruments, such as futures, options, and derivatives, which can be used to hedge risks, speculate, or invest.

Since carbon allowances present a cost factor that companies need to consider while making financial decisions, emitters, in particular, rely on hedging strategies to mitigate price fluctuations – much like risk management in commodity markets. Carbon and energy commodity markets are closely linked because fossil fuel utilisation by obligated entities determines the overall need for allowances in the market. Thus, the value of carbon allowances is intricately tied to energy sources, such as electricity, coal, natural gas, and petroleum (CFTC 2011).

Additionally, the key distinction between carbon allowances and traditional commodities lies in their physicality. Traditional commodities typically possess physical mass, leading to storage and transportation concerns, particularly in the context of trading (CFTC 2011). Contracts for the sale of a commodity typically specify delivery locations and times, with storage and transportation costs influencing the commodity's price. The expenses associated with storing a commodity serve as a deterrent, or at the very least, a constraining factor, when accumulating substantial quantities of various commodities. In contrast, allowances consist of serial numbers, and the absence of storage requirements makes it feasible to amass large quantities for future use (ICAP 2013). These similarities and differences between standard commodities and carbon allowances have led different jurisdictions to formulate different rules for financial players in carbon markets.

4. Opportunities and challenges associated with the inclusion of financial institutions and instruments

This section discusses the four major categories of financial institutions and instruments that impact carbon markets and the opportunities and challenges associated with their inclusion in carbon markets.

4.1 Banks

Banks play a critical role in carbon markets, as they can act as intermediaries, facilitating the trading of allowances and carbon credits between market participants. Often referred to as 'market makers', banks provide liquidity by ensuring a continuous presence of bids and offers whereby counterparties can easily find and execute trades. As intermediaries, banks aid in price discovery and help reduce price volatility in the market, as they help participants become more informed of the flow of bids and asking prices. The enhanced transparency in the market can help compliance entities make informed trading decisions to meet cap regulations or offset requirements.

Banks play a vital role in financing low-carbon projects by offering financial support in the form of loans, assurances, equity, or other types of funding to projects aimed at reducing or eliminating GHG emissions. Banks also provide advisory services, including due diligence, valuation, structuring, and risk management services, to assist project developers and investors in accessing carbon markets. A bank's involvement in carbon projects can vary based on the project's nature and scale, regulatory conditions, and the investment's risk– reward profile. While some banks have dedicated teams dealing with carbon finance, others have integrated it into their broader sustainability or climate finance strategies. Further, by leveraging opportunities within emissions trading systems (ETSs), banks can generate returns by financing or investing in low-carbon projects and participating in the trade of emissions allowances or carbon credits.

It is important to note that, irrespective of their inclusion in carbon markets, banks will continue to finance lowcarbon projects. However, including banks will allow them to perform additional market functions that go beyond lending to low-carbon projects to other services such as shaping complex market structures, such as derivatives markets, by developing and offering derivate contracts, including futures, forwards, options, and swaps. These instruments help obligated entities meet compliance requirements, ensuring that carbon markets effectively contribute to reducing GHG emissions. Ultimately, these additional functions make banks 'market makers' in carbon markets.

Further, if included in carbon markets, banks can replicate the market behaviours of obligated entities, especially if they are required to meet their corporate sustainability (CSR) goals. Banks can engage in CSR initiatives focused on sustainability by purchasing CCCs to offset their own emissions. Alternatively, they may participate exclusively in trading carbon credits to generate profits.

While banks are well-positioned to play a central role in carbon markets, they also face various risks in the low carbon transition process, irrespective of the presence of carbon markets. For instance, banks

could encounter risks related to stranded assets when financing or investing in activities exposed to high carbon prices or policies aimed at transitioning to a low-carbon economy. Such exposures may result in higher default rates or reduced recovery rates from their borrowers. Similarly, the European Union's (EU) proposed Carbon Border Adjustment Mechanism (CBAM) may create uncertainties for banks engaged in financing CBAM-exposed sectors like steel and aluminium. Such mechanisms could amplify the costs and risks associated with cross-border transactions and impact the competitiveness and profitability of their clients. Therefore, banks might witness an increased risk of defaults and non-performing assets. This is especially pertinent for the micro, small, and medium enterprises (MSME) sector, for whom added compliance costs will significantly impact profitability.

4.2 Institutional investors, asset management companies, and commodity trading houses

With carbon markets emerging as a viable investment avenue, institutional investors, asset management companies, and commodity traders are increasingly seeking opportunities to participate in carbon markets. As economies advance towards their netzero commitments, ensuring compliance through increased stringency will drive up the price of emissions allowances or credits, thus presenting opportunities for profit-making and gains via arbitrage for financial participants (Smyth and Goldklang 2024).



Recognising the potential of carbon markets, many fund houses, asset management companies, and institutional investors have begun developing their trading capabilities to participate in cap-and-trade and offset markets. Further, for such institutions, carbon markets present a potential avenue for portfolio risk diversification. A McKinsey study found that including carbon allowances in investment portfolios can provide downside risk protection and enhanced risk-adjusted returns, helping investors manage climate transition risks (McKinsey and Company 2021). This is because carbon allowances are not strongly correlated with traditional asset classes, such as equities or bonds, which might underperform during market downturns.

Higher participation by such financial entities will help introduce additional liquidity in carbon markets and reduce price volatility as higher trading volumes typically lead to more stable prices.

However, a significant concern associated with financial entities entering carbon markets is their potential to artificially inflate the price of carbon credits for their own financial benefit. This can run counter to governmental objectives of maintaining price stability and raise significant challenges for jurisdictions managing ETSs.

While financial institutions can perform necessary market functions and subsequently increase liquidity and facilitate price discovery, they can also engage in manipulative market behaviours that benefit their interests, causing the price of allowances or carbon credits to inflate or deflate artificially (Betz et al. 2022). Although empirical evidence of market manipulation is challenging to obtain from publicly available data, indicators from other markets, particularly the EU ETS, suggest that trading by financial participants may have contributed to the volatility and instability of EU allowances (EUAs) (Roques et al. 2022).

Following are some types of market behaviours that financial participants can engage in to manipulate the market:

1. Excessive speculation

Financial participants may engage in excessive buying or selling of allowances or credits to influence carbon prices. They may participate in trading to profit from price fluctuations rather than to fulfil compliance targets or offset their own emissions. When trading volumes significantly exceed the actual demand to meet compliance norms in the market, this indicates speculative trading activity.

With financial participants increasingly engaging in carbon markets, the risk of excessive speculation is growing. This can have significant consequences for the market, including distorted price signals, increased market volatility, the formation of bubbles, and the potential for dominant participants to exercise manipulative power (Quemin and Pahle 2022). Specific to the EU ETS, speculative trading by financial participants (at least in part) appears to have contributed to increased short-term volatility and increased EUA prices between 2018 and 2020 in the EU ETS (Roques et al. 2022). This, in turn, has led to higher compliance costs for obligated entities.

2. Deliberate triggering

In ETSs that use auctioning, market participants can trigger the release of allowance units by deliberately bidding at a high price. This is done under the assumption that the additional supply of allowances, which would get released from containment reserves, will ultimately lower the post-auction market price of allowances. This kind of effect will require the collusion of market participants to generate the mentioned effect. An analysis of New Zealand's ETS suggests that even if participants have attempted to bid at trigger prices, they have not succeeded (Denne 2022).

3. Market cornering

Market cornering occurs when a participant acquires a large share of the available allowances to gain control over the market and manipulate prices. This can result in artificial price increases or create scarcity, disrupting the market's normal functioning. Although instances of market cornering are not well documented, and the risk of a single entity undertaking such a large-scale purchase is low, it remains a possibility (Denne 2022).

Cognizant of these risks, governing bodies of ETSs across jurisdictions are tightening monitoring mechanisms and incorporating mechanisms to mitigate these risks. For instance, the European Securities and Markets Authority (ESMA) has been commissioned to monitor the new EU ETS. Meanwhile, cost containment mechanisms have been strengthened to combat excessive price fluctuations in the EU ETS and the NZ ETS (Marcu et al. 2024).

4.3 Derivative markets

The presence of a derivatives market can enhance transparency and liquidity in carbon trading, thereby aiding market growth and efficiency. They can help investors make informed long-term decisions and provide helpful signals to policymakers for carbon price regulation (ISDA 2021).

Over the past 11 years, derivatives linked to carbon prices have exhibited favourable risk-adjusted returns and shown low correlations with traditional asset classes, including commodities (Varsani and Gupta 2022). Moreover, carbon futures can play a pivotal role in helping investors mitigate carbon price risks, similar to their role in managing other financial risks by providing cost-effective hedging strategies. As a result, the use of derivatives in carbon markets is on the rise, driven by the need to manage risk, increase liquidity, and improve price discovery.

While primary markets are more established, nearly 90 per cent of compliance carbon allowances (CCAs) are traded on the futures market (Qin and Coker 2023). Trading of allowances and offsets has notably increased, with premiums observed in EU and UK carbon futures since 2018 and 2021, respectively (Smyth and Goldklang 2024).

Table 1 presents a comparison of the risk-adjusted returns of various commodities, including carbon allowances, in the EU ETS. The risk-adjusted returns measures the returns on a commodity relative to the amount of risk it is exposed to. In other words, we can interpret this as returns per unit of risk – a key metric that allows investors to assess the efficiency of an investment.

Carbon (EU ETS) has exhibited higher returns at 16.60 per cent compared to other commodities and asset classes, including gold, natural gas, copper, Brent crude oil, ACWI, and Treasury 10Y, as shown in Table 1. However, it is worth noting that carbon investments have been relatively more volatile than these other assets, with a risk level of 51.08 per cent. Therefore, Table 1 suggests that carbon can be an attractive investment option for those seeking higher returns but underscores the need to be prepared for increased volatility, as reflected in the returns-to-risk ratio, which stands at 0.32.

One key reason the EUAs have been able to offer consistent risk-adjusted returns over a decade is the policy certainty and stability provided by compliance markets. Policy decisions that shape the future market landscape can help market participants make key investment decisions. For instance, the linear reduction factor (LRF), which progressively reduces the cap of the EU ETS, provides both obligated entities and other investors full information on the timeline of cap reductions to make investment decisions.

Moreover, the likelihood of returns is always greater in more stable markets. Policy interventions in the EU ETS, through the Market Stability Reserve (MSR), for example, offer considerably more stability to compliance markets.

Name of asset	Returns (%)	Risk (%)	Returns/Risk
Carbon (EU ETS)	16.60	51.80	0.32
Gold	2.56	15.98	0.16
Natural Gas	5.48	45.09	0.12
Copper	-0.25	20.78	-0.01
Brent Crude	1.43	35.27	0.04
ACWI	7.78	14.38	0.54
Treasury 10Y	1.60	4.71	0.34

Table 1 Risk-adjusted returns of different commodities

Source: Varsani and Gupta (2022)

Note: Sample period: 18 Jan 2011–31 May 2022. We used 1-month constant-maturity commodity future prices for gold, natural gas, copper and Brent crude oil. For carbon (EU ETS), we used 12-month constant maturity future prices.

Exchanges act as an intermediary platform enabling price transparency. This boosts trading volumes and brings stability to the market, creating considerable hedging and arbitrage opportunities for market participants.

Therefore, due to policy information and stability mechanisms, compliance markets offer a more attractive investment environment than voluntary carbon markets – especially with the inclusion of derivative markets, which can factor in policy information while creating stratums of financial instruments.

In contrast, voluntary carbon markets lack policybased architectures or intervention mechanisms that can offer a similar degree of information certainty or stability as experienced in the EU ETS. Generally, trading in voluntary carbon markets is largely unregulated, which can make it difficult for them to attract investors, especially against the backdrop of reputational and functional concerns about offset quality (Dawes et al 2023). However, as international organisations work to establish consistent standards and enhance guidance, coupled with the pressure of approaching corporate net-zero timelines, voluntary carbon markets are expected to mature and offer steady investment bets tied to high-impact climate action projects.

4.4 Trading platforms

Exchanges and OTC markets are trading platforms where carbon allowances or carbon credits can be bought and sold. These platforms play an important role in the proper functioning of a carbon market, offering stability and efficiency to the market.

In addition, exchanges promote market growth and innovation by offering market intelligence and advisory services, and introducing derivates-based financial instruments in the market. At the same time, exchanges can face challenges related to market manipulation and other fraudulent activities, which can impact market volatility and the overall environmental credibility of the market. Currently, the Intercontinental Exchange (ICE) is the largest carbon trading platform; it comprises the four most actively traded carbon markets: the EU ETS, the Western Climate Initiative, the Regional Greenhouse Gas Initiative (RGGI), and the UK ETS. Its ICE Global Carbon Futures Index (ICECRBNT) has observed an annual return of 28.27 per cent between December 2013–June 2022, outperforming traditional asset classes (ICE 2023).

Despite the existence of exchange platforms such as AirCarbon Exchange (ACX), Chicago Mercantile Exchange (CME), Xpansiv CBL, and Taiwan Carbon Solution Exchange (TCX) voluntary markets, most offset trades occur on OTC platforms. Due to a demand for flexibility in the voluntary carbon market space, OTC offers a suitable platform for trading carbon credits by allowing for greater flexibility and fewer formal requirements. Here, contracts can be highly customised and tailored to meet the specific needs of buyers and sellers. Thus, OTC platforms remain dominant as they offer flexibility, customisation, and privacy in an ever-evolving voluntary carbon market.

5. Financial players in the EU ETS

ESMA conducted an analysis in 2022 to understand the role and trading behaviours of financial players in the EU ETS. The study found that there are no major irregularities or fundamental issues present in the EU ETS concerning financial player participation, though there is a need for enhanced monitoring.

The study observed that allowances auctioned in the EU ETS primary market are heavily traded in the secondary market, indicating an efficiently functioning market with high trading activity. For instance, of the total number of transactions in June–December 2021, investment firms and credit institutions accounted for 61.47 per cent (ESMA 2022). In the same period, the secondary market had an average monthly trading volume of USD 62 billion, mostly through derivatives contracts (ESMA 2022). This indicates that financial participants – especially investment firms, credit institutions, and funds – play an active role in the EU ETS as intermediaries and traders. On average, between 2018 and 2022, nearly 65 per cent of participants in the secondary market for EUAs were financial players (Roques et al. 2022).

ESMA observed that compliance entities in derivative markets usually take long positions, which means they commit to buying allowances at a set price in the future, thereby mitigating the risks associated with potential price rises. Typically, financial participants are natural counterparties for compliance entities in the futures market to help meet their hedging needs. Meanwhile, financial entities take short positions for strategic reasons as they aim to capitalise on speculated movements of carbon prices and make gains via arbitrage.

6. Key questions and concerns of relevant stakeholders

CEEW conducted a roundtable discussion to understand the perspectives of Indian stakeholders on 25 August 2023. This section discusses the key issues and concerns from the discussion.

6.1 Should financial players be allowed in the CCTS (compliance)?

As discussed earlier, financial players are wellpositioned to play a crucial role in carbon markets. They provide market liquidity, facilitate effective price discovery, and offer financial services to other players by providing advice, debt support, etc. The case of the EU ETS demonstrates that only large entities have the necessary resources to participate in the auction process, leaving smaller entities dependent on the support provided by financial players. The CCTS (compliance) is expected to become one of the largest cap-and-trade-based carbon markets globally, with potential partial linkages with other regional carbon markets. Financial players should be allowed in the market to ensure its effective functioning. However, an important point to note is that if these players purchase a large share of carbon credits, the regulator must impose limits on the number of positions they can hold to avoid shortages in the market. Over time, these limits could be gradually relaxed with market oversight and international experience. Policymakers must establish robust infrastructure with the necessary safeguards and transparency to create a level playing field for financial and obligated entities. Additionally, policymakers will need to consider introducing price floors and ceilings, containment or stability reserves, and circuit breakers to ensure price stability, especially if financial players eventually become part of the market.

6.2 Should financial players be included in the CCTS (compliance) from the very beginning or after a couple of phases?

With their greater experience in trading commodities, financial players may outperform obligated entities and make windfall profits. However, this risk remains even if financial players are introduced a few years after the market opens to obligated entities. To combat this, the government must implement necessary safeguards within the carbon markets before allowing financial players into the market. These safeguards may include allowing only a certain percentage of carbon credits to be held by financial players, control management by the government to ensure that no hoarding of carbon credits leads to price rises, etc. The government must be cognisant of different scenarios through which financial players could exploit the carbon market. The core purpose of a carbon market should be decarbonisation, and the policy framework should ensure it.

6.3 What are the critical lessons to be learnt from existing markets like REC and PAT?

India has previous experience in implementing renewable energy certificates (REC) and the Perform Achieve and Trade (PAT) market. These markets were not open to financial players. However, it is important to learn from the experiences of these markets. This learning can also make the carbon market more lucrative for financial players.

1. Ensure compliance in the market:

The policy framework should make it mandatory for the obligated entities to comply. This can be achieved by implementing robust measuring, reporting, and verification (MRV) interventions and an effective penalty. Ensuring compliance in the market will build the confidence of financial players to participate.

2. Ensure long-term policy certainty:

The government needs to provide long-term policy certainty to the obligated entities as well as financial players. This will build investors' trust and lead to enhanced liquidity in the market. Policy certainty will also lead obligated entities to invest in decarbonisation measures at the entity level, leading to emissions reductions.

6.4 What are the learnings from international markets that CCTS (compliance) could incorporate?

As of 2024, there are 36 ETSs worldwide, covering 18 per cent of global GHG emissions, with another 14 schemes currently under development (ICAP 2024). The involvement of financial players in these ETSs varies, though most have included financial players since their inception. Table 2 provides a comparison of when various ETS were established and the year of entry of financial players .

The European Union (EU) permits financial players to participate in the EU ETS, while South Korea did not in its beginning phases. It would be beneficial for India to learn from the Korean case to effectively assess the advantages and disadvantages of not including financial players in the Indian context.

In the case of South Korea, it did not permit financial players to operate in its market in phases I (2015-2017) & II (2018-2020). This resulted in a liquidity crisis driven by low trading volumes, limited participation of entities, and an oversupply of allowances to the extent that the trade of Korean Allowances Units (KAUs) completely stopped for a period of 8-months in 2015 (Etienne and Yu 2017). To mitigate these issues, regulators of the

K-ETS allowed financial intermediaries and brokers to participate in exchange trading in 2021 in an effort to boost liquidity. The Government of Korea permitted the entry of 20 non-compliance entities in the form of domestic financial intermediaries to participate in the K-ETS (ICAP 2022) beginning 2021.

As part of a larger reform process proposed in September 2023 which is expected operational by 2025, the Government of Korea has released new rules to improve the functioning of the market, focusing on market participation and banking. Key areas of the reform include introducing a futures market in the K-ETS, permitting individual participation, and increasing the number of financial player participation in the K-ETS (ICAP n.d.). Despite the liquidity crunch, prices in the carbon market have remained relatively stable², which is an important factor meriting discussion because financial player participation will inevitably affect market volatility due to the influx of liquidity.

Based on the K-ETS experience, another important consideration for the ICM will be on deciding where to allow financial participants to trade in the baseline and credit market or the offset market. The K-ETS suffered from considerable price distortions as financial participants were not permitted to trade KAUs on the

Emissions trading schemes	Beginning year	Entry of financial players	No. of financial players
South Korean ETS	2015	2021	21 (ICAP n.d.)
EU ETS	2005	2013	350 investment funds (Eich 2022)
UK ETS	2021	Since inception	NA
California ETS	2012	Since inception	NA
Quebec ETS	2013	Since inception	NA
RGGI	2009	Since inception	NA
NZ ETS	2008	Since inception	NA
China National ETS	2021	Framework under development	NA
Kazakhstan ETS	2013	2018	NA
Mexican ETS	2022	Framework under development	NA
Tokyo ETS	2010	Since inception	NA

Table 2 Timeline of the inclusion of financial players across major ETS worldwide

Source: Authors' compilation

Regulations also play a key role in addressing these issues. Like the EU ETS, the K-ETS relies on market stability measures to control the flow of allowances in the market and limits the holdings and borrowings of market participants. This kind of regulatory intervention by the Government has helped the K-ETS stabilise carbon prices (Joo et al. 2023).

Korean Exchange in its compliance market, whereas financial players could participate in trading activities on OTC platforms in the voluntary offset market space. Their participation allowed for effective price discovery of Korea Offset Credits (KOCs), as opposed to KAUs which suffered from a lack of trading activity and liquidity in the compliance market. For instance, in the first year of operation, only 321,000 KAUs changed hands (equivalent of 0.06% of total KAUs freely allocated to emitters), while in the same period, nearly 5 to 7 million KOCs changed hands (Etienne and Yu 2017). This caused KOCs to be valued higher than KAUs - which is counterintuitive to market logic in carbon trading because KAUs are necessary to meet compliance requirements, whereas only 10% KOCs could be eligible as offsets in the compliance market. Thus, there were clear distortions in the price relationship between KAUs and KOCs. One way to correct and restore this price relation, was for market regulators to allow financial intermediaries and brokers to participate in the trading of KAUs on the Korean Exchange, which would boost liquidity in the market and increase the trading volume on the exchange - correcting imbalances (Etienne and Yu 2017). Similarly, if on one hand the ICM considers not including financial players in the compliance market and restricts their participation on the Power Exchange (where CCCs will be traded), and on the other hand allows financial players to participate in voluntary markets, there might be similar patterns of imbalances between compliance and voluntary credit prices as observed in the Korean ETS.

Finally, it is important to recognise that India's carbon market differs significantly from those in the EU, UK, and other regions where financial institutions play a vital and multifaceted role. These institutions offer comprehensive services beyond just monetary

Finally, It is important to recognise that India's carbon market differs significantly from those in the EU, UK, and other regions where financial institutions play a vital and multifaceted role. transactions, catering to various corporate needs. For example, they provide data-based analysis and information about market dynamics to interested parties. Products such as spots and forwards provided by these institutions in the EU are vital for ensuring liquidity. The potential for services beyond trading in the carbon market could also be explored within the Indian context, especially since we observe an increasing trend of corporations engaging more extensively with financial institutions

7. Conclusion and recommendation

Financial institutions are an integral part of any market-based mechanism. Financial players can serve as key drivers of the price discovery process in the CCTS (compliance), leading to better decisionmaking by companies. However, allowing financial players to participate in the carbon market requires the establishment of a robust policy ecosystem that safeguards the carbon market against manipulation.

As the CCTS (compliance) develops, the first phase will require a 'learning by doing' approach. This implies that, by design, emissions mitigation targets/ caps should not be stringent, as the main objective in the initial phase is for companies to learn the system. In subsequent phases, however, we can expect the stringency of emission targets to increase progressively as India moves towards peaking its emissions and eventually achieving net zero. The two options are as follows:

(i) Involving financial players from the outset, when targets are less stringent, offers several advantages. Companies will gain faster and deeper insights into how the carbon market will eventually be operationalised, learning from the actions of financial players and understanding the information embedded in those actions. Indian financial players will build their capacities toward this, and the government will learn the systems as well as safeguards that need to be established for the involvement of financial players. There appears to be no downside apart from the fact that their involvement from the beginning would entail a lot more work for the government and a higher commitment in terms of human resources.

(ii) Involving financial players only in the next phase, after three years, would delay the learning process.
Waiting would imply that this learning will happen after three years and in a relatively more stringent emissions mitigation regime. The potential upside of this delay to the ecosystem is unclear. Ultimately, the choice boils down to when India's corporates and government should be exposed to this learning.

To conclude, we argue that financial players should be included in the market at the earliest, and the government should start the groundwork for the same. As a rule of thumb, the sooner the better.

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