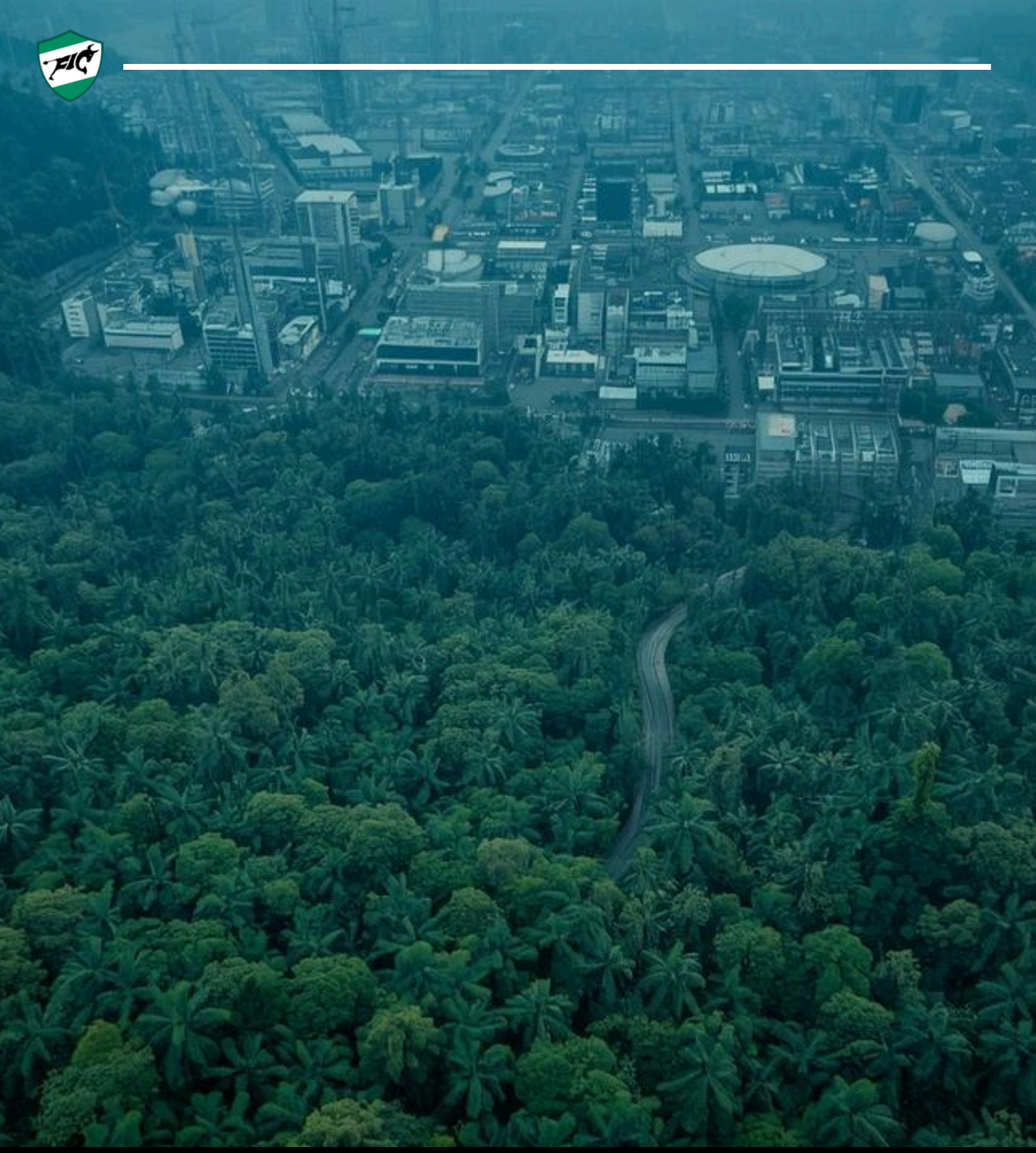

CARBON CREDITS & ESG INDUSTRY PRIMER

FINANCE AND INVESTMENT CELL
SHRIRAM COLLEGE OF COMMERCE

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INTRODUCTION

Climate and sustainability are no longer irrelevant to global finance, instead they have become key drivers of how economies plan, how companies operate and how capital flows across borders.The number of carbon credits issued in 2025 across major registries are ~294 million credits while the number retired is ~168 million credits .The CO_2 removal credit market could be $100 billion/year by 2030–35 . Over the last decades, an entire industry has emerged around one idea: how do we measure, manage and value the environmental impact of economic activity?

This industry has two major pillars:

- ESG disclosures - frameworks that push companies to report how they affect the environment, society and governance systems.
- Carbon markets - systems that put a financial price on carbon emissions, allowing companies to trade credits, reduce their footprints and fund climate-positive projects.

They collectively constitute a rapidly evolving ecosystem that encompasses regulators, rating organizations, verification organizations, developers of environment projects, stock exchanges, investors, corporates, and international standard setters. This, which started as an exercise for corporate responsibility reporting, has now become an entire finance sector that influences investment choices and costs of capital. In the case of countries such as India, this scenario is of particular importance. The reason is that the growth in India is very energy-intensive. In such a scenario, having a mechanism to deal with emissions as well as a way to sustain growth through transparent and market-oriented mechanisms is required. ESGs provide a way to showcase Indian companies' sustainability to global investors. Carbon markets provide a mechanism to align development targets with emissions requirements.

In this primer, the building blocks of this industry, the evolution of the notion and aim of ESG and carbon markets, the participants who shape the notion and aim, and the relevance to the future of sustainable finance shall all be explored. First, the challenge of speed and trust in the growth and standardization of this industry shall be examined.

The Measurement and Trust Deficit in Sustainable Markets

The fact is that the markets are shifting towards sustainability, but the systems that are supposed to aid within this context are still not very standardized and clear. Businesses around the world are supposed to be measuring their environmental and social footprint, but the system used to quantify all these is not standardized around the world.

The OECD (Organisation for Economic Co-operation and Development), IFRS-ISSB (International Financial Reporting Standards - International Sustainability Standards Board), and other such entities are some of the examples of how a lack of data comparability creates a huge gap in the sense that:

Investors show that they want to handle their funds responsibly, but the results that each investor relies on to do so are certainly anything but consistent. In a way to fix these inconsistencies, carbon markets were designed. These carbon markets allow companies to indirectly compensate for lower emissions by placing an economic price on these savings. Theoretically, there would be an incentive, but there would also be credibility concerns. Studies conducted by Integrity Council on Voluntary Carbon Markets (ICVCM) and UNEP identify that there are concerns regarding additionality, monitoring, and governance frameworks.

One fundamental, though very significant, divergence at the heart of this issue: ESG disclosures and carbon credits are parallel tracks, not yet converging. Valid ESG data helps create baselines, gauge risk, and understand actual environmental performance. Valid carbon markets use all this information to drive tangible climate outcomes. If these tracks don't intersect, both are diminished. The issue, then, is what can be explored regarding how these paths can not only intersect for a healthy environment, but how they can intersect so sustainability can be properly valued, responsibility made clear, and value unlocked for the long term.

ESG: From Corporate Disclosure to Financial Risk Framework

ESG has undergone a sea change over the last ten years in terms of how companies and investors approach the subject. What began as a series of sustainability disclosures provided voluntarily had morphed into an integral part of business assessment. Rather than being tacked on at the end of the annual report or set forth in a CSR-narrative format, ESG acts today as a lens through which to examine long-term risk and opportunity. With global markets growingly sensitive to climate exposure, social responsibility, and ethical governance, ESG moved from "good to have" to "fundamental for assessing resilience."

ESG as a Risk-Assessment Structure

Investors are increasingly using ESG information to inform themselves on their ability to weather climate risk, ensure qualified human resources, regulatory forces, and good governance structures. When it comes to poor ESG performance, it is no longer just an issue of reputation, according to studies by MSCI, OECD, and major financial institutions, firms with inferior environmental or societal practices risk climate disruption, penalty of regulatory compliance, or financial failure. In short, ESG performance is not just an additional metric, it is now embedded risk management built into capital markets.

Important Findings

"ESG considerations are having a tangible impact on market outcomes." They can ensure that a company is managing risks in the present in a way that positions them well in the future. It is a framework through which a company’s performance on a range of matters, including its exposure to carbon price risk, treatment of employees, can be measured. "ESG metrics shed light on a company’s exposure to carbon price risk, social responsibility, governance."

What ESG Measures

To understand ESG's usefulness, it helps to break down what it actually evaluates:

- Environmental: Emissions intensity, energy efficiency, water use, waste management, pollution control, biodiversity impact and climate-risk exposure.
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- Social: Labour standards, workplace safety, diversity and inclusion, supply-chain ethics, community engagement and human-capital development.
-
- Governance: Board independence, audit quality, shareholder rights, executive compensation alignment, ethical compliance and internal controls.

The Move Toward Standardisation

Standardisation in ESG did not happen overnight. For a long time, ESG reporting had a basic problem. Different companies reported different things. Even when they talked about the same issue, they used different numbers and different methods. Because of this, it was hard to compare companies properly or to know how accurate the data really was.

This is why standardisation started becoming important. Instead of leaving ESG open to interpretation, the focus slowly shifted toward more fixed and structured reporting. Frameworks such as GRI, SASB and TCFD were introduced over time to bring some order to the process. More recently, the ISSB standards have tried to bring these approaches together by setting a common base for sustainability disclosures. In India, the BRSR format follows a similar idea. It takes guidance from global standards but also fits Indian regulatory needs.

What this means for Markets and Carbon Systems

Better ESG reporting does not only mean more information is available. It also affects how carbon markets work. When environmental data is clearer and more reliable, it becomes easier to set proper baselines for carbon projects. This matters because weak or unclear data can lead to false claims and greenwashing.

Governance indicators also play a role here. Poor governance increases the chances of wrong reporting or misuse of carbon credits. When ESG reporting and carbon markets support each other, trust improves. Investors feel more comfortable putting money into these markets, and climate action starts to have real financial value instead of being just a formal requirement.

The Information Layer: How Sustainability Data Actually Moves

This part of the primer looks at something most people don't think about straight away, how data actually travels from a company's operations into the hands of investors, analysts and regulators. It might sound technical, but it really matters because it shapes what decisions get made and how quickly.

At the source, sustainability data begins with the everyday records of a company. That could be electricity bills, fuel invoices, supplier reports, HR logs, third-party audits, and even satellite readings in some cases. These come from different departments that often don't talk to one another.

In many firms, environmental data sits in one database, social data in another, and governance records somewhere else- meaning there is fragmentation right at the start. This fragmentation slows things down and adds errors.

Once collected, the data often goes through a mix of manual collection and basic automation. Smaller companies still rely on spreadsheets, while larger ones usuLLY have dedicated software tools. Investors and data providers then collect these disclosures but they often do so from annual reports, CSR reports, company websites, regulatory filings and multiple databases. There is no single feed or universal pipeline, so data ends up being patchy or inconsistent.
Then come the aggregators and rating agencies. Each of them applies their own methodology, fills gaps with estimates, and sometimes even uses AI tools to interpret unstructured text. This leads to an average correlation of a mere 0.54 across different methodologies. This helps with speed but introduces a variety of problems. A recent study shows that over 70% of investors see “inconsistent and incomplete” ESG data as a major obstacle.

In short, there is no seamless flow from source to decision-maker yet. Instead there are multiple translations, interpretations and transformations, often without independent verification. The result is that the data which is supposed to underpin ESG and carbon market decisions ends up being uneven, patchy, and hard to compare across companies, regions or time.

ESG Value Chain

The ESG Value chain is the framework through which companies facilitate the flow of data related to the Environmental, Social and Governance factors that affect their supply chains so that they are better able to make decisions with respect to these factors. Data related to these factors travels through several intermediaries ultimately culminating in the development of ESG Scores on the basis of which investment decisions are ultimately taken. This Value chain finds its origin in the operations of the company, where companies identify the factors related to the environmental, social and governance spheres and attempt to express them in quantities.

Identification of ESG Factors
The process is initiated by the companies identifying the ESG factors that predominantly affect their business through materiality assessments. In this process, the most significant ESG factors that affect the stakeholders of the business and its operations are prioritized to help focus efforts on handling them. Materiality is going to vary across different business segments - carbon emissions are a major factor for energy companies, while privacy of data will have a greater priority in case of technology companies. The assessment can be conducted by reviewing the issues highlighted in the SASB’s materiality map which illustrates the map for factors related to 77 industries, conducting surveys among the stakeholders to gain information about qualitative factors, and conducting internal risk assessments to identify operational and reputational risk exposure.

The Output of this is a materiality matrix of various factors which are plotted on the two dimensions - stakeholder importance and impact on the environment. This matrix aids in the identification of KPIs.

Quantification and Measurement

Environmental factors - Companies measure and report data in areas such as Green House Gas emissions, effect on air quality measured by the quantity of pollutants released, effect of treatment of waste on water quality and general waste management data. For the correct calculation of emissions, companies use the GHG protocol corporate standard, which categorises emissions into 3 separate scopes. Water metrics rely on the use of the WRI Aqueduct which maps the water stress levels across different regions, allowing companies to weight the damage of their water usage in different regions. Waste management metrics are measured by the type of waste, the method used to dispose of it and the proportion of waste kept out of landfills by recycling or reusing.

Social Factors - These metrics are obtained from HR systems in the form of workforce diversity, remuneration equity across all groups, turnover rates with demographic divisions, health and safety rates, training hours,etc.

Governance Factors - These are relatively straightforward factors like board structure and independence(proportion of board not composed of company employees, diversity,etc.), compensation breakdowns for senior executives, transparency in reporting, regulatory compliance,etc.

Disclosure

Companies publish ESG data through sustainability reports, integrated reports and securities filings. Most companies follow GRI, SASB,TCFD or integrated reporting frameworks. Many companies also submit to CDP, which scores companies A-D on disclosure quality. Sustainability reports are also published on corporate websites which allow extensive detail about the factors. ESG data is also required to be submitted in securities filings (Form 10-K, EU annual reports.) EU CSRD mandates sustainability statements in management reports as having the same legal standing as financial information.

Rating Agency and ESG Scores

ESG rating agencies use the data they obtain from company disclosures to assign comparable scores to companies on the basis of which capital allocation decisions are made. Some major rating agencies are- MSCI, Sustainalytics, ISS ESG, S&P Global, Refinitiv. They rate thousands of companies and these ratings are taken into consideration by investors who are conscious about ESG issues. Apart from company disclosures other data sources like reports on controversies, NGO databases, government actions, litigation records are also examined by the agencies. The methodology adopted by the agencies for rating the companies varies from agency to agency. For example, the weights assigned to the E or S or G factors may differ. Different measurement approaches may also have been taken. MSCI uses CCC-AAA rating to grade companies on ESG performance. Sustainalytics uses 0-100 risk rating, while ISS provides decile rankings. The variation in rating and philosophy makes cross-agency comparison very difficult as the same company might be allotted different grades.

Time Mismatch: When Markets Think Short-Term and Climate Acts Long-Term

One thing that really trips people up when they think about finance and climate is time. Financial markets tend to think in short cycles, quarterly reports, annual earnings, yearly fund performance. Climate change, by contrast, is a long game. Temperatures, emissions, and ecosystem shifts play out over decades or centuries. This simple mismatch can create real problems.

Investors often make decisions based on recent performance and short-term signals. For example, a fund manager might shift capital because a company's earnings next quarter are expected to rise or fall. But climate impacts like rising sea levels or transition risks from energy shifts don't show up clearly in that short window. This makes it harder to price long-term climate risks into current market valuations.

What complicates matters further is that some of the most important climate data is backward-looking. Most ESG scores and disclosures describe historical performance rather than future trajectories. That means investors are often buying decisions based on yesterday's sustainability picture, even though climate risk is forward-looking.

Another layer of this mismatch is seen in carbon markets. A carbon credit might represent a tonne of avoided emissions today, but the actual climate benefit usually occurs over years or decades. Meanwhile, financial markets quickly trade the credit for short-term gains. This creates a kind of disconnect between financial value today and climate impact tomorrow.

The mismatch doesn't just affect risk pricing. It also affects corporate strategy. If CEOs know that quarterly profits matter more to investors than long-term decarbonization pathways, they may delay investments in sustainability even when those investments are economically sensible in the long run.

Because of this, many analysts now talk about the need for long-duration finance instruments, bonds, transition finance, and climate indexed derivatives that match the time preferences of climate outcomes better than traditional tools.

Carbon Credits: Their Economic Functions and Market Processes

Market Overview and Economic Importance

A carbon credit is a market based tool to reduce emissions by a "cap and trade" system which is aimed at reducing emissions by restricting emissions and enabling companies to trade unused credits. The voluntary carbon market was valued at USD 1.7 billion in 2024 and USD 4 billion in 2025 and is projected to grow at a CAGR of 35 % by 2030,expected to reach USD 23.99 billion by 2034.The compliance carbon markets,regulated by the state ,were valued at USD 130.7 billion in 2025.The overall carbon credit market size was estimated at USD 933.23 billion in 2025 and is forecasted to reach USD 1,301 billion in 2026,expanding at a CAGR of 37.68% from 2025 to 2034 . The rise in this demand has been fueled by growing public surveillance ,increasing corporate net- zero expectations,stricter regulations and financial incentives.

Renewable Energy Installations
The global renewable energy market was valued at USD 43.3 billion in 2024and projects which include solar hydroelectric and biomass garnered a significant 39% of voluntary carbon credit markets' revenue in 2024. China,the world's largest carbon dioxide emitter and energy consumer has continuously increased investment in such energy resources which has improved energy efficiency and innovated low carbon-emission policies.

Reforestation and Afforestation Schemes
Carbon accounting involves taking into account the direct emissions from manufacturing facilities and fuel burned by vehicles ,indirect emissions from heating,cooling , steam and supply chain emissions which include supplier emissions and product use and disposal emissions. Afforestation schemes involve the biotic sequestration of CO2 from the atmosphere in trees and soil to reduce net emissions. It facilitates financial incentives for landowners through carbon income.Carbon credits,howeer,cannot be earned for reforestation activities as it does not create any additional carbon sequestration value after planned harvesting.

Industrial Efficiency Upgrades
Improvements in manufacturing efficiency mean that less energy is consumed for each unit of product. The credit calculations assess energy intensity at the baseline level and after the improvement, factoring in changes in production levels. The projects must be assessed in terms of additionality by analyzing the financial, technology, institutional, and regulatory barriers that would make it difficult to undertake without carbon financing.

Compliance Markets: State-Regulated
Compliance Markets are the government regulated systems where companies are legally bound to offset their carbon emissions to meet the national climate goals. In these markets,securities are exchanged at a legally binding price,driven by government policy.Some of the major trading systems include the European Union Emissions Trading System(ETS),China's National ETS and The California Global Warming Solutions Act .This functions on "cap -and- trade" schemes where governments sets a limit on the emissions by a certain company.These are binding targets,beyond which it is penalised.

Regulation and Governance of Carbon Markets

Carbon markets exist as mandatory (compliance) schemes or voluntary programs.
Cap and trade schemes (also known as emissions trading schemes (ETS)) usually fall into the first category. Under these schemes, a limit (cap) is set on the total amount of certain greenhouse gases that can be emitted. Companies buy or receive emissions permits (or allowances) which they can trade with one another. At the end of each year, companies must surrender enough allowances to cover their emissions or incur heavy fines. Where a company reduces its emissions, it can keep spare allowances or sell them to another company.

The EU ETS is the world's largest cap and trade scheme. The UK ETS went live on 1 January 2021. Other ETSs operate in Australia, Brazil, China and, at a state level, in the US.
Baseline-and-credit mechanisms (also known as carbon credit schemes) are largely voluntary. These schemes allow the purchase or sale of carbon credits, which represent 1 tonne of CO_2e being removed from the atmosphere or not produced. While ETSs cap emissions, carbon credit markets allow companies to manage the impact of their emissions.

Voluntary markets function independently of compliance markets, and the credits traded cannot be used to meet legal or regulatory obligations.

India was a major player in the CDM , which issued around 15% of all certified emission reductions (CERs), largely relating to renewable energy. Since the discontinuation of Kyoto mechanism, India introduced a domestic market Carbon Credit Trading Scheme (CCTS) by the enactment of Energy Conservation Amendment Act, 2022. The CCTS is a rate-based ETS and offset instrument managed by the BEE , while trading is administered by CERC. The initiative is intended to be consistent with Article 6 of the Paris agreement, enabling the authorization of domestic credits as ITMOs. It includes challenges like ensuring policy coherence , institutional capacity , market liquidity and trade mechanisms like the EU's Carbon Border Adjustment Mechanism (CBAM). The success of India's market depends on environmental integrity and international standardisation.

Voluntary Carbon Markets: Corporate Net Zero and Offset Mechanisms

Voluntary Carbon Markets are the markets where carbon credits offsets are freely created and exchanged by companies to accomplish a net zero.These are not subjected to any state regulations or compliances except certain regulations concerning transparency ,rather they are driven by corporate responsibility and the desire to support The Paris Agreement and other such treaties.Although the VCM is significantly smaller than compliance market in terms of transaction values and has shown a decline in the past few years, it is expected to reach between USD 7 and USD 35 billion by 2030.The VCMs suffer from lack of standardisation due to the absence of legal compliances,diverse methodologies and quality concerns.

Verification Standards and Quality Criteria

Additionality Assessment
This concept states that the reduction in emissions achieved must be in addition to what would have been already achieved in the ordinary course of business,creating a net positive impact on greenhouse emissions. It prevents overcrediting,as companies cannot claim more carbon credits than their actual emissions reductions.

Permanence and Reversal Risk Management
In case they are permanent, then reductions or removals need to be firmly out of the atmosphere rather than reversed by deforestation, deterioration, or project failure. The carbon dioxide released by burning stays in the atmosphere for 300-1,000 years, which means that carbon storage of a similar timescale is required.

Green Bonds and Climate Finance: Funding the Low-Carbon Transition
A Green Bond is a fixed- income instrument which specifically supports green initiatives and those which are beneficial for the environment.The markets for green bonds have shown growth in countries with stricter regulations and compliances with a significant reduction in emissions.Certain green bonds are linked with tax incentives and exemptions.Green bond issues provide funding for activities that decrease the intensity of carbon emissions in renewable energy.A study on the effect of green bonds in China and the United States indicated that green bonds reduced greenhouse gases in the transport sectors of both nations.These are becoming increasingly popular among investors that are assuming their responsibilty towards the environment.

Global Carbon Markets: A Spectrum of Regulation, Pricing and Trust

How regulators and market forces sit on a spectrum affect buyers (investors) market trust, stability of prices, and overall market operational credibility. The EU Emission Trading System (ETS), the most regulated, has PERMIT prices recently at €82/tCO_2 (November 2025) after demand and supply constraints. China has the most extensive national systems, with the highest emissions at 8 billion tCO_2 and a growing global emissions share. China is expanding its sectoral coverage verticals (initially energy, expanding to steel, cement, and aluminum). Adding to the growing list of constraints, voluntary carbon markets (VCMs) are the least flexible, even more than most market systems, with varied approaches, types and scopes of initiatives. Ecosystem Marketplace shows that the annual value of voluntary markets transactions recently decreased to US$535 million in 2024.

This market shows extreme volatility and signs of an appetite for higher quality credits. The national Carbon Credit Trading Scheme (CCTS) and ICM (Integrated Carbon Markets) regulation for 2024 (which are yet to be finalized) aim to make domestic offsetting routes better organized and more transparent. This places India in the middle range. With more developed provisions, greater legal compliance, and clear rules, India can advance to the high-integrity range.

Market Division:

The EU ETS and similar systems function on an unambiguous cap-and-trade paradigm. This means that there is a large and highly in-demand market for permits; in late November 2025, permits were priced at €82/ton of CO_2. Like other large-scale, national systems, China's national ETS accounts for a large share of global activity, similar to a developing industry that is complying with evermore stringent carbon regulations. As the world's largest CO_2 emitter, with roughly 8 billion tons of CO_2, China's national ETS is also the largest, and is expanding the scope of affected sectors. After starting with power plants, it is now moving to steel, cement, and aluminum. This activity, particularly in the Voluntary Carbon Markets, is highly variable. These markets also have a high degree of variability in terms of project types, methodologies, and pricing. The market has also been highly unpredictable as buyers emphasize the acquisition of higher-quality credits. Total deal value has decreased to approximately $535 million by 2024.

India's Stance:

With its national Carbon Credit Trading Scheme (CCTS) and draft ICM regulations (guidelines expected in 2024) in the moderate category, India is striving to improve the level of domestic offset market transparency and organization. India's shift to high-integrity could be achieved through the adoption of more robust and clear standards and enforcement of the verification process.

India and Global Carbon Markets: Strategic Opportunities and Risks

As India aims to become the third-largest economy by 2030, it is imperative to decouple economic growth from carbon emissions. India is the world's third-largest emitter of greenhouse gases but has low per-capita emissions. Recognising this responsibility, India committed to the Panchamrit Pledge, including carbon neutrality by 2070, and follows the principle of Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC).

India launched the Carbon Credits Trading Scheme (CCTS), establishing a unified Indian Carbon Market (ICM) to reduce emissions through the trading of carbon credit certificates. Obligated entities will have emission intensity targets and may receive or purchase carbon credits based on performance. India already operates market-based schemes such as the Perform, Achieve and Trade (PAT) scheme and the Renewable Energy Certificates (REC) system.

Globally, carbon pricing mechanisms are expanding, with 75 carbon taxes and emissions trading schemes in operation, covering around 24% of global emissions. Middle-income countries such as Brazil, India, and Turkey have made progress towards implementing carbon pricing.

The CCTS allows non-obligated entities to participate by earning tradable carbon credit certificates, each representing one tonne of CO_2e, with the compliance segment scheduled to commence in 2025–26. However, despite these advantages, India's participation in the global carbon credit market raises concerns about equity, bargaining power, and the distribution of climate responsibility between developed and developing nations.

Key Concerns from India's Perspective

1. Risk of Carbon Colonialism

Developed countries may rely on purchasing low-cost carbon credits from India instead of undertaking deep emission reductions domestically. This shifts the mitigation burden onto developing countries, undermining the principle of Common but Differentiated Responsibilities.

2. Unequal Value Capture

India may supply large volumes of carbon credits at relatively low prices, while developed economies capture greater economic and technological benefits. This risks reinforcing existing global inequalities rather than enabling a just transition.

3. Lock-in of Low-Carbon Potential

Selling carbon credits internationally could exhaust India's low-cost mitigation opportunities, leaving fewer options for meeting its own future climate targets as its economy grows.

4. Weak Negotiating Position in Global Markets

Given asymmetric power dynamics, India may have limited influence over global carbon market rules, pricing, and standards, increasing the risk of unfavorable terms dictated by advanced economies.

Structural Challenges in Carbon Credit Markets

Carbon Credits face various challenges in the realization of their objectives and have faced repeated criticism of being counterproductive for various reasons.

Additionality concerns

Additionality requires that a carbon offset transaction needs to happen in order for reduction in emission to take place. In other words, a project satisfies the additionality requirement if the emissions removals that it attempts to achieve are not possible without the carbon finance it receives from the sale of carbon credits in the voluntary market. If a project fails the additionality test, it indicates that the carbon credits sale was not absolutely necessary for the emissions reduction, it would have happened anyways. This makes the trade of carbon credits a usual business activity as opposed to something that contributes to climate change. India, Brazil and China collectively account for about 84% of carbon offsets linked to renewable energy projects, and these offsets have questionable additionality given that renewable energy is seeing active penetration along with strong policy support in these nations. There is a risk that credits are subsidizing activities that would have happened without carbon finance.

Overcrediting

Some projects are subject to methodological overcrediting where, due to some faulty calculator, they claim more carbon credits than the actual emissions reduction that they achieve.

Due to this, there is an abundance of weak credits trading in the market which are not backed by the removal of commensurate emissions. There is an emergence of premium pricing for credits that achieve proportionate emissions reductions. This is especially seen in soil carbon and forestry projects that often overestimate reductions by 2-10 times due to assumptions that diverge from reality. This flooding of the market with cheap credits can make companies appear carbon neutral without actually easing emissions impact.

Green Washing

Companies use greenwashing to appear more environmentally friendly than they truly are by purchasing low quality carbon credits that do not achieve proportional reduction in emissions. The objective of carbon credits is never achieved and companies continue to increase their emissions and purchase carbon credits to validate their carbon neutrality when they are not implementing any primary reduction in emissions. Shell, Chevron and other oil majors bought more than half the voluntary credits in 2024, while simultaneously giving effect to fossil fuel production expansion. This negates the objective of carbon credits to incentivize a shift to cleaner technologies over time.

Credits Offset and do not Eliminate

Although the regulatory carbon credit initiative will incentivize businesses to adopt cleaner technologies in light of declining caps and rising credit prices. However, voluntary carbon offset programs aren't used to reduce emissions but only result in the offsetting of emissions which can lead to risks of maintenance of the current emissions level without any environmental relief.

The Future of Carbon Markets: Reform, Convergence and Scale

Price Recovery

The price of voluntary carbon credits had crashed in the period 2023-2024 due to integrity scandals which created opportunities for greenwashing and overcrediting. This would lead to companies buying a large number of credits while the funding received by projects would remain inadequate. However, prices are estimated to recover; BloombergNEF forecasts that
Reforestation credits will reach $60/ton by 2030 and even $104/ ton by 2050.

Article 6 Paris Agreement

COP29 finalized carbon credits international trading rules. Article 6.2 provides for bilateral credit transfers. Article 6.4 establishes the Paris Agreement Crediting mechanism, a centralised credits market supervised by the UN. 5% of every credit transaction will be transferred to an adaptation fund to aid vulnerable nations. This will make a global standardisation of carbon credit prices possible and prevents unreasonable pricings.

CORSIA Aviation

From 2027, Airlines that have higher emissions than 85% of the baseline established at 2019 levels will have to purchase carbon credits in the voluntary markets to offset their emissions. Prices of credits have jumped due to higher demand by airlines. This would incentivize the aviation sector to shift towards sustainable fuels.

National Expansions

China ETS - China plans to target the steel aluminium and cement sectors over the phase 2024-2028. Instead of using a fixed cap system, China sets intensity based emissions targets where the firms are incentivized to minimize emissions per unit of production.

India CCTS - India is launching a carbon credits trading scheme in 2026 which covers about 2400 factories in sectors such as cement, steel, fertilizers,etc. These factories will need to meet emissions targets, for the facilitation of which a parallel voluntary system of credits will exist for clean project funding.

South-East Asia - Countries across South-East Asia are developing connected carbon trading markets with nations like Indonesia, Malaysia, Vietnam,etc. targeting heavy industries and the power sector over the next few years. ASEAN Common Carbon Framework also provides standards that facilitate trade of carbon credits.

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CONTRIBUTORS

Research and Design Team

Jayesh Karwa
Devansh Sharma
Sachleen Kaur
Tanush Garg

Cabinet

Soham Sharda
Vaanchhit Agarwal