



STUDY OF CARBON CREDIT TRADING: A NEW FINANCIAL ASSET CLASS

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Abstract:

Climate change has intensified the need for effective mechanisms to reduce greenhouse gas emissions while maintaining economic efficiency. Carbon credit trading emerged as a market-based solution under international climate frameworks, enabling the allocation and exchange of emission allowances through structured regulatory systems. This study examines the concept, functioning, and economic relevance of carbon credit trading with particular emphasis on its evolution as a potential financial asset class.

The research follows a descriptive and comparative design based on secondary data collected from official reports and market databases. Carbon credit price trends over a five-year period (2021–2025) were analysed across selected global Emissions Trading Systems, including the European Union Emissions Trading System, Canada Federal Output-Based Pricing System, California Cap-and-Trade Program, China National Emissions Trading Scheme, Germany National Emissions Trading System, Korea Emissions Trading Scheme, New Zealand Emissions Trading Scheme, Switzerland Emissions Trading System, Tokyo Cap-and-Trade Program, and the UK Emissions Trading Scheme. Year-wise price comparison was conducted to examine market behaviour, demand–supply interaction, and price volatility.

The findings reveal significant variations in carbon credit prices across different markets, reflecting differences in regulatory frameworks, policy stringency, and market maturity. European markets demonstrated comparatively higher price levels, while certain Asian markets maintained lower and more stable price bands. The observed price fluctuations, structured trading platforms, and measurable economic value indicate that carbon credits possess characteristics similar to tradable financial assets.

Keywords: Carbon Credit Trading, Carbon Pricing Trend, Financial Asset Class

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Introduction:

Climate change has become one of the most significant global challenges affecting environmental sustainability and economic stability. Rapid industrial growth, increased energy consumption, and rising greenhouse gas emissions have intensified concerns about global warming. To address this issue, policymakers and international organizations introduced market-based mechanisms that encourage emission reduction while maintaining economic efficiency. Carbon credit trading emerged as an innovative solution that combines environmental responsibility with economic incentives by assigning measurable value to emission reductions.

The concept of carbon credits was formally introduced through international climate agreements aimed at controlling global greenhouse gas emissions. Under the Kyoto Protocol (1997), countries agreed to limit emissions and were allowed to adopt flexible mechanisms to achieve these targets. One of the key mechanisms

was emissions trading, which established the principle that the right to emit a specific amount of carbon dioxide could be quantified, allocated, and traded. Governments or regulatory authorities began setting emission limits for industries and distributing emission allowances to companies based on predefined criteria such as historical emissions or production levels. Companies that reduced emissions below their allocated limits could sell surplus carbon credits, while those exceeding limits were required to purchase additional credits. This system created a structured economic incentive for emission reduction and marked the beginning of carbon credits as tradable instruments.

Following these developments, several countries and regions established formal emissions trading systems with legal and regulatory frameworks. Prominent examples include the European Union Emissions Trading System and the China National Emissions Trading Scheme, which operate through cap-and-trade mechanisms. Under these systems, regulatory authorities impose an overall emissions cap for specific sectors and issue tradable allowances to participating companies. The trading of these allowances in regulated markets led to the emergence of carbon pricing, market participation, and investment behaviour similar to other financial markets. Over time, carbon credits gained recognition not only as environmental compliance instruments but also as assets with measurable economic value.

In addition to compliance markets, voluntary carbon markets developed globally, allowing companies to earn carbon credits by implementing emission reduction or carbon removal projects such as renewable energy generation, energy efficiency improvements, and afforestation initiatives. These developments expanded corporate participation and strengthened the economic relevance of carbon trading worldwide. The evolution of international regulations, climate agreements, and market institutions has therefore transformed carbon credits into an emerging component of global financial systems.

In India, the development of carbon credit regulation has progressed in alignment with international climate commitments. India actively participated in the Clean Development Mechanism under the Kyoto Protocol, enabling Indian companies to generate carbon credits through emission reduction projects and trade them in international markets. Recognizing the need for a domestic regulatory framework, the Government of India enacted the Energy Conservation (Amendment) Act, 2022, which provides the legal basis for establishing a national carbon market through the Carbon Credit Trading Scheme (CCTS). This framework aims to create a regulated system for issuing carbon credit certificates and promoting emission reduction across industrial sectors. Despite these regulatory initiatives, the Indian carbon credit market is still in an emerging stage compared to mature global emissions trading systems. Trading activities currently occur mainly through project-based and voluntary carbon markets rather than a fully operational compliance emissions trading system with stable pricing and extensive market participation. However, increasing policy support, corporate engagement, and institutional development indicate growing interest in carbon trading within India. This evolving market structure provides significant scope for academic analysis and evaluation.

The need for the present study arises from the increasing recognition of carbon credits as tradable economic instruments with characteristics similar to financial assets. Global carbon markets demonstrate price formation,

demand-supply interaction, and investment relevance, while India's developing carbon market reflects emerging institutional and regulatory dynamics. Therefore, examining the evolution, regulatory framework, and market behaviour of carbon credit trading is essential to understand its growing importance in modern financial systems. Accordingly, this research aims to analyse the historical development, legal framework, and market trends of carbon credit trading at global and national levels. By evaluating international carbon pricing trends and the emergence of the Indian carbon credit market, the study seeks to assess whether carbon credit trading can be considered a new financial asset class with increasing economic and investment significance.

Conceptual Background:

1. Origin and Introduction of Carbon Credit Trading: Carbon credit trading originated as a global policy response to climate change under international environmental governance frameworks. The system was formally introduced through international climate agreements developed under the United Nations Framework Convention on Climate Change, which established mechanisms to control greenhouse gas emissions using market-based approaches. The adoption of international emission reduction commitments in the late 20th century led to the creation of tradable emission allowances, giving economic value to emission reduction activities. This marked the beginning of carbon credit trading as both an environmental policy tool and an economic instrument.

Under this framework, emission limits were defined for industries and countries, and measurable units representing emission reductions were created. Organizations that reduced emissions below prescribed levels or implemented approved emission reduction projects became eligible to receive carbon credits. These credits could be traded, thereby encouraging cost-effective emission reduction through market incentives.

2. Meaning and Definition of Carbon Credit: A carbon credit is a tradable certificate representing the reduction, removal, or avoidance of one metric tonne of carbon dioxide or equivalent greenhouse gases. It functions as a measurable unit within emission control systems and can be exchanged in carbon markets.

A carbon credit may also be defined as a market-based environmental instrument that either permits a specified level of emissions or represents verified emission reduction achieved through approved environmental activities.

3. Financial Asset Class: A financial asset class refers to a group of tradable instruments that share common characteristics such as market value, liquidity, and return potential. Traditional financial asset classes include equities, bonds, and commodities. Carbon credits are increasingly examined as a potential financial asset class because they possess market-determined prices, can be traded, and represent economic value derived from environmental performance.

4. How Companies Receive Carbon Credits: Companies receive carbon credits through two primary mechanisms. First, regulatory authorities may allocate emission allowances to companies operating within regulated sectors based on benchmarks or historical emission levels. If a company emits less than its permitted level, it retains surplus credits that can be sold in the market. Second, organizations can earn carbon credits by implementing verified emission reduction or carbon removal projects such as renewable energy

production, energy efficiency improvements, or afforestation programs. These projects are assessed, verified, and approved according to established standards before credits are issued.

5. **Issuance and Verification of Carbon Credits:** Carbon credits are issued by authorized regulatory bodies or approved certification agencies operating under national or international frameworks. The issuance process typically involves project registration, monitoring of emission reduction, independent verification, and certification. Once verified, carbon credits are recorded in official registries and become eligible for trading in carbon markets.
6. **Regulation of Carbon Credit Trading Worldwide:** Carbon credit trading is regulated through international agreements and national regulatory frameworks. Global climate governance mechanisms guide national emission reduction commitments and establish broad policy directions. At the regional and national level, governments implement emissions trading systems and designate regulatory authorities responsible for monitoring emissions, issuing credits, and ensuring compliance. Regulated emissions trading systems such as the European Union Emissions Trading System and the China National Emissions Trading Scheme operate under structured legal frameworks that define emission caps, allocate allowances, and supervise market transactions.
7. **Regulation and Framework of Carbon Credit Trading in India:** India has participated in global carbon credit mechanisms through emission reduction projects and has developed a national regulatory framework to support domestic carbon markets. The legal foundation for carbon credit regulation has been established through national policy initiatives aimed at creating a structured system for issuing carbon credit certificates and promoting emission reduction across industrial sectors. The regulatory framework provides for monitoring, certification, and potential trading of carbon credits within a national system. Although the domestic carbon market is still developing, regulatory measures and institutional arrangements indicate growing policy support for carbon trading in India.
8. **Carbon Credit Trading Market:** Carbon credit markets are organized systems where carbon credits are issued, recorded, and traded among participants. These markets function through demand and supply interactions, regulatory oversight, and standardized verification procedures. Carbon markets can operate under mandatory compliance systems or voluntary participation frameworks. Through these mechanisms, carbon credits gain economic value and function as tradable environmental assets.

Research Methodology:

Objective:

1. To understand the concept of carbon credit trading.
2. To study how carbon credit trading works in practice.
3. To examine carbon credits as a financial asset class.

Scope of the Study:

- The study explains the concept and basic functioning of carbon credit trading.
- The research analyses year-wise carbon credit price trends over a five-year period.

- The study compares price movements across selected global carbon trading markets.
- The research examines market demand and price behaviour of carbon credits.
- The study evaluates carbon credits as an emerging financial asset class based on trend analysis.

Limitations of the Study:

4. The study is based only on secondary data collected from published sources.
5. Differences in rules and structures across carbon markets may affect price comparability.
6. The analysis is limited to five selected markets and a five-year time period.
7. Carbon credit prices are influenced by policy and economic factors beyond the scope of this study.
8. Carbon credit trading is still a relatively new concept and awareness among the general public and investors is limited.

Literature Review:

Lokesh Agarwal (2021) conducted a study on Carbon Credit Trading: An overview which concludes that carbon credit trading is an effective mechanism to reduce carbon emissions while providing financial, reputational, and market benefits to industries such as energy, transportation, agriculture, and manufacturing. However, despite its advantages, challenges and lack of public awareness remain key issues, highlighting the need for wider education and stronger implementation to ensure environmental sustainability.

Ajay Garg and Satyendra Arya (2015) conducted a study on the opportunity analysis of Carbon Credit Trading for Developing World- A Case Study which observe that India has immense potential in the global carbon trading market and could emerge as a major beneficiary. Although India has shown strong performance under the Clean Development Mechanism (CDM), the absence of a clear policy and dedicated legal framework limits its full potential, making regulatory reforms essential for future growth.

Research Methodology:

1. The study follows a descriptive and comparative research design.
2. The research is based on secondary data collected from official reports, databases, and research publications.
3. Carbon credit price data is collected for five selected global carbon markets.
4. The study uses year-wise price comparison for a five-year period to identify trends.
5. The collected data is analysed to evaluate price movement, demand pattern, and asset-like characteristics of carbon credits.

Data Analysis & Interpretation:

The European Union Emissions Trading System, established in 2005, is the world's first and most developed carbon credit trading system. It operates on a cap-and-trade mechanism where a limit is set on total emissions and companies receive or purchase emission allowances. The system covers power generation, aviation, and energy-intensive industries across European countries. Due to its long operational history and large trading volume, it is considered the global benchmark for carbon pricing and market stability.

The Canada Federal OBPS, implemented in 2019, is a performance-based carbon pricing mechanism designed for emission-intensive industrial facilities. Instead of a fixed cap, emission limits are based on output standards, and companies exceeding limits must compensate through carbon credits. The system focuses on balancing environmental responsibility with industrial competitiveness and applies mainly to large industrial emitters.

The California Cap-and-Trade Program, launched in 2013, is a regional carbon trading system covering power plants, fuel suppliers, and major industries. It operates through emission allowances that can be traded among regulated participants. The program is recognized for its structured regulatory framework and relatively stable carbon pricing trends, making it a significant model for sub-national climate policy implementation.

The China National Emissions Trading Scheme, introduced at the national level in 2021, is currently the largest carbon market in the world based on emissions coverage. Initially focusing on the power generation sector, the system allocates emission allowances based on performance benchmarks. It represents a major step in global climate governance due to China's large industrial base and emission levels.

The Germany National Emissions Trading System, established in 2021, operates as a national fuel emissions trading framework. It covers sectors such as transport and heating fuels that are not included in broader regional carbon systems. Fuel suppliers are required to purchase emission allowances, thereby incorporating carbon costs into energy consumption patterns.

The Korea Emissions Trading Scheme, launched in 2015, is a nationwide cap-and-trade system covering power generation, industry, and aviation sectors. It was the first national emissions trading system implemented in East Asia. The system plays a central role in the country's strategy to manage industrial emissions while supporting economic development.

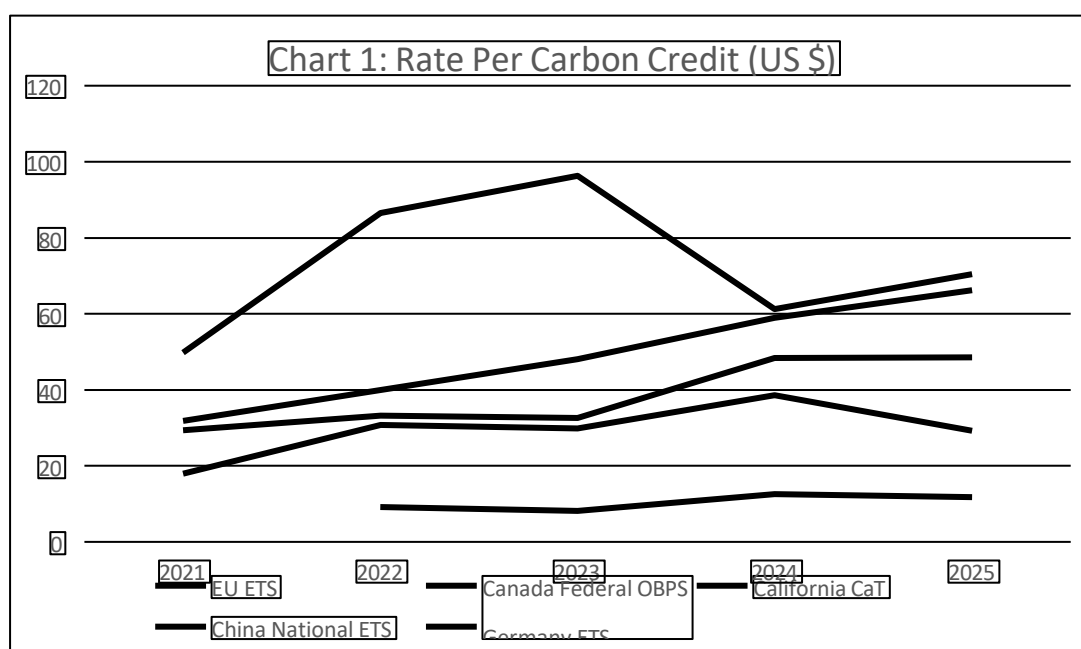
The New Zealand Emissions Trading Scheme, introduced in 2008, is one of the earliest nationwide carbon markets outside Europe. It covers multiple sectors including forestry, energy, industry, and waste management. The system allows participants to trade emission units and emphasizes long-term environmental sustainability through market-based regulation.

The Tokyo Emissions Trading Scheme, implemented in 2010, is a city-level cap-and-trade system focusing on large commercial buildings and industrial facilities. It is recognized as the world's first urban emissions trading system and demonstrates how carbon markets can operate effectively at a metropolitan governance level.

The Switzerland Emissions Trading System, established in 2008, is a national cap-and-trade program covering energy-intensive industries. The system is linked with the European carbon market, enabling cross-market compatibility and strengthening international cooperation in emission reduction efforts.

The UK Emissions Trading Scheme, introduced in 2021, functions as an independent national carbon trading system covering power generation, aviation, and heavy industry. It was developed to maintain domestic carbon pricing mechanisms and environmental regulation through a structured allowance trading framework.

Table 1. Rate Per Carbon Credit (US \$)					
year	EU ETS	Canada Federal OBPS	California CaT	China National ETS	Germany ETS
2021	49.78	31.83	17.94		29.365
2022	86.53	39.96	30.82	9.19	33.156
2023	96.3	48.03	29.84	8.15	32.625
2024	61.3	58.94	38.59	12.57	48.3705
2025	70.37	66.21	29.27	11.76	48.546



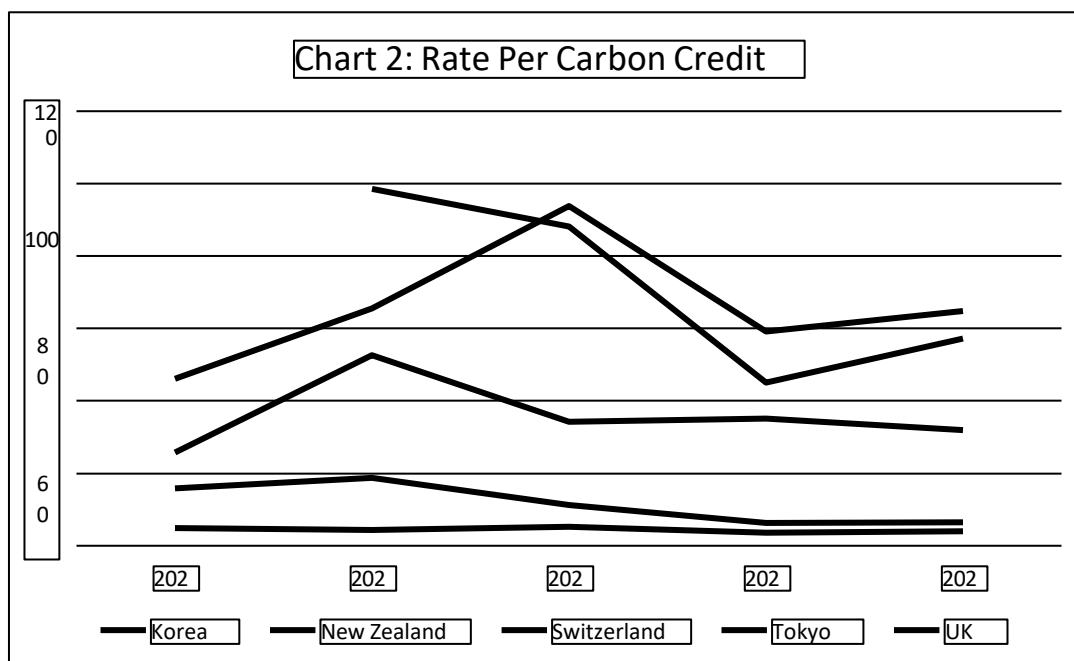
(Data Source: <https://share.google/3hoVrFEfQuceSlbmW>)

The data on carbon credit prices from 2021 to 2025 reveal significant variations across different Emissions Trading Systems (ETS). The UK ETS consistently recorded the highest carbon credit prices, peaking at USD 98.55 in 2022 before declining to USD 45.06 in 2024 and moderately recovering to USD 57.22 in 2025, indicating notable market volatility. Similarly, the Switzerland ETS demonstrated a sharp upward trend from USD 46.1 in 2021 to a high of USD 93.81 in 2023, followed by a decline and partial recovery in subsequent years. In contrast, the New Zealand ETS showed moderate fluctuations, rising significantly in 2022 (USD 52.62) and then stabilizing around the mid-30 USD range between 2023 and 2025. The Korea ETS experienced a general downward trend after 2022, falling from USD 18.75 to around USD 6–7 by 2024–2025. The Tokyo Cap-and-Trade (Tokyo CaT) system maintained the lowest and most stable prices throughout the period, remaining within the USD 3–5 range. Overall, the analysis highlights substantial price disparities and volatility among international carbon markets, reflecting differences in regulatory frameworks, market maturity, and demand–supply dynamics.

Table 2. Rate Per Carbon Credit (US \$)

Year	Korea ETS	New Zealand ETS	Switzerland ETS	Tokyo CaT	UK ETS
2021	15.89	25.75	46.1	4.87	
2022	18.75	52.62	65.59	4.42	98.55
2023	11.24	34.19	93.81	5.24	88.12
2024	6.3	35.11	59.17	3.6	45.06
2025	6.45	32.01	64.74	4	57.22

Chart 2: Rate Per Carbon Credit



(Data Source: <https://share.google/3hoVrFEfQuceSlbmW>)

The data on carbon credit prices from 2021 to 2025 indicate considerable variation across major global carbon markets. The European Union Emissions Trading System (EU ETS) recorded the highest price levels among the selected systems, rising sharply from USD 49.78 in 2021 to a peak of USD 96.30 in 2023, before declining to USD 61.30 in 2024 and moderately recovering to USD 70.37 in 2025, reflecting both strong regulatory pressure and market adjustments. The Canada Federal OBPS exhibited a consistent upward trend throughout the period, increasing steadily from USD 31.83 in 2021 to USD 66.21 in 2025, indicating gradual strengthening of carbon pricing mechanisms in Canada.

The California Cap-and-Trade Program showed moderate fluctuations, rising from USD 17.94 in 2021 to USD 30.82 in 2022, dipping slightly in 2023, peaking at USD 38.59 in 2024, and declining again in 2025. The China National Emissions Trading System maintained the lowest price levels, remaining within the USD 8–13 range, suggesting a relatively controlled and developing market structure. Meanwhile, the Germany ETS displayed a gradual upward trend overall, particularly after 2023, reaching approximately USD 48.55 in 2025.

Overall, the analysis highlights that European markets command comparatively higher carbon prices, while Asian markets such as China maintain lower price bands, reflecting differences in policy stringency, market maturity, and emission reduction targets.

Conclusion:

This study examined the concept, functioning, and economic relevance of carbon credit trading with the objective of evaluating whether carbon credits can be considered a financial asset class. Based on conceptual understanding and comparative price trend analysis across major global carbon trading markets over a five-year period, the findings indicate that carbon credits demonstrate clear economic value, tradability, and measurable price behaviour.

The comparative analysis shows that carbon credit prices vary across markets but generally reflect increasing regulatory importance and growing demand for emission allowances. Structured trading systems such as the European Union Emissions Trading System and the China National Emissions Trading Scheme illustrate how carbon credits are issued, traded, and valued within regulated market frameworks. Price fluctuations observed across different systems indicate that carbon credits respond to policy changes, compliance requirements, and market participation, which are key characteristics of financial assets.

The study also observes that although carbon credit trading is still developing in many regions and public awareness remains limited, global policy support and institutional participation continue to expand. The existence of formal trading platforms, standardized units, and measurable price trends strengthens the argument that carbon credits possess asset-like features similar to other tradable financial instruments.

Therefore, based on conceptual analysis and empirical price trend comparison, the study concludes that carbon credit trading is emerging as a new financial asset class within the modern environmental and financial system. The increasing integration of environmental regulation with market mechanisms suggests that carbon credits will continue to gain economic relevance and investment significance in the future.

The study concludes that carbon credit trading is emerging as a new financial asset class within the modern environmental and financial system. As regulatory frameworks strengthen and global climate commitments expand, carbon credits are l

ikely to gain increasing economic and investment significance.

Bibliography:

1. World Bank report (2025) trends of Carbon Pricing Retrieve from <https://share.google/3hoVrFEfQuceSlbmW>
2. Lokesh Agarwal (May 2021) A Study on Carbon Credit Trading: An Overview Retrieve from <https://share.google/q0Wm5oijAHGif03O>
3. Ajay Garg Satyendra Arya (February 2015) The opportunity analysis of carbon credit trading for developing world- A case study Retrieve from <https://share.google/2x0DYNUCD1XEgT343>

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