



A Study on Carbon Credits and Carbon Market as a Tool to Reduce Global Carbon Emissions

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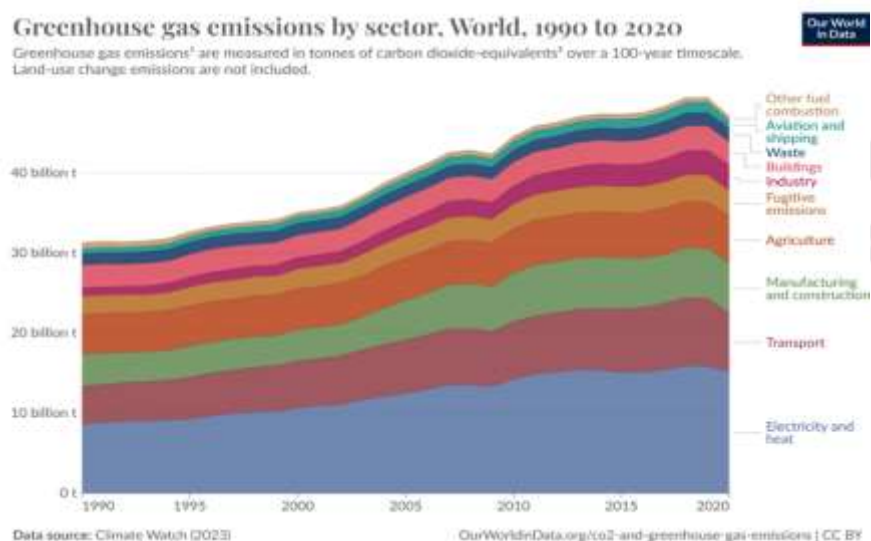
Abstract: One of the most significant issues facing humanity in the twenty-first century is acknowledged to be climate change. The phenomenon known as the greenhouse effect, which keeps the earth's average temperature at 15°C and permits life to survive, is the cause of the climate change issue. The Kyoto Protocol, which put forth the idea of carbon credits and a carbon market, was ratified in 1997 in an effort to reduce greenhouse gas emissions worldwide and combat climate change. The process by which nations or parties that release more greenhouse gases pay one another is known as carbon credit. Depending on a number of variables, these carbon credits can be purchased or sold on global markets at a certain market price. In order to promote more sustainable and environmentally friendly activities in terms of global GHG emissions, this led to the creation of the international carbon market, where parties trade carbon. This study studies the Indian Carbon market and Carbon credits used for trading as well as the several initiatives undertaken by Government of India to promote carbon credits and contribute to reduce global carbon emissions.

Index Terms - Carbon credits, carbon trading, Governmental measures

1. INTRODUCTION

India faces particular difficulties in combating climate change because it is one of the most populated and rapidly expanding economies in the world. The nation's transportation sector, industrial expansion, and energy production all greatly increase its carbon footprint. The Indian government has taken a number of actions to incorporate carbon offset methods into its national climate change strategy in recognition of these difficulties. In the Indian context, carbon credits and offset mechanisms have grown in significance as the nation works to battle climate change and achieve sustainable development.

Fig:1 Greenhouse gas emissions by sector, World 1990 to 2020



2. REVIEW OF LITERATURE

Trivedi S. (2016) provided an explanation of the carbon or greenhouse gas market. The market for greenhouse gases is growing daily. Additionally, the researcher stated that this industry is expanding across numerous nations, regions, and business partnerships

worldwide. This new and developing market provides significant prospects for organizations and their sponsors with emission reduction or clean development mechanism projects, as well as efficient risk management techniques for a variety of enterprises with emission limits. Lastly, he describes how developing nations manage their energy resources or take advantage of opportunities. His research also gives a brief introduction of the Kyoto Protocol, carbon credit trading, the greenhouse effect, and the nascent greenhouse market.

Garg, Arya and Mudgal (2017) have stated that carbon credit trading, as introduced under the Kyoto Protocol, as a process allows companies to buy and sell credits to reduce greenhouse gas emissions. Carbon credit trading is growing quickly in India, where firms that had no previous carbon constraints are bracing themselves for coming carbon regulations in a low-carbon economy. The research presents the advantages and challenges of carbon credit trading. Many organizations are already benefiting in both monetary and non-monetary terms and many apply for the market. Carbon credits attach a monetary value to pollution, making carbon a cost of doing business, comparable to raw material or labor. Companies who don't use up their allowances can sell them as carbon credits, while those who exceed their allowances can buy additional credits. This open market structure offers vast potential. The paper will seek to explore the benefits and challenges of carbon credits in the Indian industry.

Philip (2024) states while it is aspiring to be the third-largest economy of the world by the year 2030, India faces the daunting task of establishing a development model that promotes economic growth without adding to carbon emissions. It is the third-largest greenhouse gas emitter and per capita emissions marring India stand below the world average. The Indian government is committed to emissions reduction at the highest level, under the direct reign of Prime Minister Narendra Modi, via the Pledges of the Panchamrit-a set of goals for 2030 with a vision of total decarbonization by 2070. The underlying tenet of such a strategy is a balanced approach to development and climate action based on the principle of CBDR-RC. Initiatives like Mission LiFE and the Green Credit Programme promote sustainable lifestyles. In addition, the introduction of the Carbon Credits Trading Scheme (CCTS) builds on existing environmental laws to create the Indian Carbon Market (ICM), a policy designed to control greenhouse gas emissions via carbon credit trading.

Singh, Arora, & Chaturvedi (2024) states that with an enormous economy and emission outlook, India's Carbon Market (ICM) is on its way to being one of the largest in the world compliant with carbon trading markets. The roles of financial players include the provision of financial intermediation to improve market functions, price discovery at an efficient level, and proposals for risk transfer mechanisms such as forwards, futures, options, and swaps. Such functions are necessary for optimal trade decisions by trading corporates and catalyzing carbon-sink-enhancing activities. The discussion focused on three classes of financial players: hedgers, speculators, and arbitrageurs. It assessed the roles of banks, institutional investors, asset management firms, and commodity trading houses in carbon markets. Their entry into these markets promises some opportunities, but increased price volatility, and market manipulations are challenges posed. Despite these challenges, the authors conclude that financial players should be included in the CCTS to make the market more efficient. But some safeguards against market manipulation should also be installed. The crux is not about the inclusion of financial players, but rather, the timing of this inclusion, with convergence leaning more towards earlier involvement in market development.

3.OBJECTIVES OF THE STUDY

- To study the overview of Carbon credit and Carbon market.
- To study several initiatives undertaken by Government of India to promote carbon credits and contribute to reduce global carbon emissions.
- To identify the emerging opportunities and trends in carbon offsetting and the challenges faced by the carbon market.

4.RESEARCH METHODOLOGY

The study is descriptive in nature and data was taken from secondary sources like journals, newspapers, government publications and annual report of companies.

5.AN OVERVIEW OF CARBON CREDIT AND CARBON MARKET

With carbon credits, the holder is granted permission to emit a specific quantity of carbon dioxide (CO₂) or comparable greenhouse gases (GHGs). One ton of CO₂ emissions is usually equivalent to one carbon credit. Efforts to lower global carbon emissions, particularly under agreements like the Paris Agreement, depend heavily on this idea. Platforms for the purchase and sale of carbon credits are known as carbon markets. They can be voluntary (where businesses and individuals purchase credits to offset their emissions without being subject to regulations) or regulatory (compliance markets, where governments impose restrictions on emissions).

Mechanisms:

- 1. Cap-and-Trade Systems:** Under these systems, governments impose a total cap on emissions. Businesses purchase or receive a specific quantity of carbon credits. These credits are exchangeable, so businesses that cut emissions can sell their extra credits to businesses who go over their allotted limits.
- 2. Project-Based Mechanisms:** Carbon credits can be produced by initiatives that lower emissions, such as reforestation or renewable energy projects. Carbon markets can then be used to sell these credits.
- 3. Voluntary Markets:** To offset their emissions and support initiatives aimed at lowering or eliminating greenhouse gas emissions, businesses and individuals can voluntarily buy carbon credits.

6.PROSPECTS FOR THE FUTURE

- **Stricter Regulation:** More extensive carbon markets and more stringent regulations are anticipated to arise as global awareness of climate change increases.
- **Technological Developments:** Technological developments, such blockchain for credit tracking, can improve the efficiency and

transparency of carbon markets.

- **Integration with Other Environmental Goals:** There is a growing possibility that carbon markets may be connected to more comprehensive sustainability programs, like social justice and biodiversity preservation.
- **International Cooperation:** Increased international cooperation may be the key to lowering global emissions, particularly in emerging economies' nascent carbon markets.

7.OVERVIEW OF THE MANY FRAMEWORKS AND AGREEMENTS PERTAINING TO CARBON MARKETS AND CARBON CREDITS:

An overview of the many frameworks and agreements pertaining to carbon markets and carbon credits is provided below:

1. Kyoto Protocol (1997)

Overview: The first international agreement to set legally binding obligations for developed countries to reduce greenhouse gas emission

- **Mechanisms:** Three market-based mechanisms were introduced.
- **Emissions Trading:** Emission allowances can be purchased and sold by nations.
The Clean Development Mechanism (CDM): It enables wealthy nations to contribute to emission reduction initiatives in developing nations in exchange for credits.
Joint Implementation (JI): It enables developed nations to invest in carbon reduction initiatives in other developed nations, thereby earning credits.

2. The 2015 Paris Agreement

Overview: A landmark global accord that aims to limit global warming to well below 2°C, with efforts to limit the temperature increase to 1.5°C.

- **Mechanisms:**

Places a strong emphasis on each nation's nationally determined contributions (NDCs), giving nations leeway in how they achieve their goals.

Introduces Article 6, which makes it easier for nations to reach NDCs through voluntary collaboration and market mechanisms like carbon trading.

3. Green Climate Fund (GCF)

- The UN Framework Convention on Climate Change (UNFCCC) established the Green Climate Fund (GCF) to help developing nations adapt to climate change.

Mechanisms:

It promotes initiatives that can produce carbon credits and adds to larger climate funding, even though it isn't a carbon market in the traditional sense.

4. Voluntary Carbon Market Standards

There are several guidelines for voluntary carbon markets, such as:

Verified Carbon Standard (VCS): Widely used standard for certifying carbon credits from various projects.

Gold Standard: Focuses on projects that deliver sustainable development benefits alongside emission reductions.

8.SEVERAL INITIATIVES UNDERTAKEN BY GOVERNMENT OF INDIA TO PROMOTE CARBON CREDITS AND CONTRIBUTE TO REDUCE GLOBAL CARBON EMISSIONS:

To encourage carbon credits and help lower global carbon emissions, the Indian government has launched a number of initiatives. Here are a few important projects:

1. Overview of the National Action Plan on Climate Change (NAPCC)

The NAPCC, which was established in 2008, describes India's approach to combating climate change, which includes encouraging sustainable habits, energy efficiency, and renewable energy. The goal is to improve energy efficiency and promote sustainable energy, both of which can help produce carbon credits.

2. The Plan for Perform, Achieve, and Trade (PAT)

A vital part of the National Mission for Enhanced Energy Efficiency (NMEEE), which is part of the NAPCC. Specific energy efficiency goals are set for industries. Energy saving certificates (ESCerts), which function as carbon credits, can be traded by those who surpass their goals.

3. Mechanism for Clean Development (CDM)

India has played a key role in the Kyoto Protocol's CDM, which permits wealthy nations to fund emission reduction initiatives in India. A large number of forestry, waste management, and renewable energy projects have produced carbon credits, promoting both regional growth and worldwide emissions reductions.

4. Climate Change State Action Plans (SAPCC)

Every Indian state must create an action plan that is in line with the NAPCC. These strategies include measures to increase carbon sinks, encourage renewable energy, and improve energy efficiency—all of which can help generate carbon credits.

5. Overview of the National Biofuel Policy

Encourages the use of biofuels as a substitute for fossil fuels. India hopes to lower greenhouse gas emissions by producing more biofuel, which could result in the creation of carbon credits through sustainable practices.

6. Faster Manufacturing and Adoption of Electric Vehicles (FAME India Scheme)

The objective of this scheme is to lessen dependency on fossil fuels and promote electric cars (EVs). By switching to EVs, emissions can be significantly reduced, which makes it easier to create carbon credits.

7. Initiatives for Renewable Energy

By 2030, India wants to have 500 GW of energy capacity derived from non-fossil fuels. By lowering dependency on coal and other fossil fuels, investments in solar, wind, and biomass projects can result in sizable carbon credits.

8. Projects for Reforestation and Afforestation

A number of projects encourage afforestation and replanting. By absorbing CO₂, these programs can provide carbon credits, supporting national and international efforts to reduce emissions.

9. Mines for Coal Management of Methane

The efforts are taken to extract methane from coal mines for energy production. These initiatives can improve energy security and produce carbon credits by lowering methane emissions.

9. EMERGING OPPORTUNITIES AND TRENDS IN CARBON OFFSETTING

1. **Technological Developments:** New prospects for carbon offsetting are being brought about by technological developments. Increased trust and involvement in carbon markets can result from the widespread adoption of digital technologies like blockchain, which can increase carbon trading's efficiency and transparency.
2. **Trend Towards Decentralized Renewable Energy Systems:** Decentralized renewable energy systems, such as local wind energy installations and solar rooftop panels, are becoming more and more popular. With the help of these devices, people and companies can produce renewable energy on their own, feed into the grid, and possibly receive carbon credits.
3. **Carbon Neutral Business Engagement:** Due to investor demand, consumer preferences, and regulatory pressure, more companies globally—including in India—are pledging to become carbon neutral. This is giving carbon markets a big boost by raising demand for carbon offsets.
4. **Customer-Driven Demand:** As people's awareness of climate change grows, so does their desire for carbon-neutral goods and services. The market for carbon offsets is expanding as a result of companies lowering their carbon footprint and funding carbon offset initiatives.
5. **Global Cooperation:** Increased international cooperation may be the key to lowering global emissions, particularly in emerging economies' nascent carbon markets.

10. CHALLENGES FACED BY CARBON MARKET

1. **Market Volatility:** The stability of investments and projects might be impacted by large fluctuations in carbon credit prices.
2. **Measurement and Verification:** It can be difficult and expensive to measure and confirm emissions reductions accurately.
3. **Regulatory Frameworks:** Participation and compliance may be hampered by regionally disparate rules.
4. **Greenwashing:** When businesses promote climate progress by purchasing questionable carbon offsets, this practice is known as "greenwashing."
5. **Insufficient fee transparency:** Without clear standards for carbon credits, it can be difficult for companies to know if they are reducing their emissions.
6. **Volatile prices:** Carbon offset exchanges can face volatile and unpredictable prices.

11. CONCLUSION

As more nations implement cap and trade programs or broaden the industries that the regulations apply to, the compliance market, which is already significantly larger than the voluntary one, keeps growing. Carbon credits are a crucial tool in the fight against climate change, encouraging sustainable practices and providing incentives for reductions in greenhouse gas emissions. The agreements and frameworks represent a variety of approaches to carbon trading and emissions reduction, underscoring the significance of both compliance and voluntary mechanisms in the global effort to combat climate change. Although it faces obstacles including quality standards and greenwashing, the Voluntary Carbon Market (VCM) has demonstrated effectiveness in advancing climate action and sustainable development.

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