

Blockchain Boosts the Carbon Credit Economy

Sweety Sharma^{1,*}, Kiran Singh²

Abstract

Carbon Credit Trading started in the year 1997. A total of 180 countries signed the Kyoto Protocol. Unfortunately, the goal set forth in the Protocol, which called on countries to reduce their greenhouse gas emissions to 1990 levels by 5% between 2008 and 2012 was never accomplished. In today's world, environmentalists strive to promote policies and business practices that are beneficial to the environment. The rising levels of carbon dioxide in the Earth's atmosphere are a cause for global concern due to its contribution to global warming. As a result, a universal carbon market has emerged, offering opportunities for trading carbon credits both within and beyond regulated areas. Blockchain technology is characterized by a chain of blocks linked together, providing integrity and security in a variety of applications. Utilizing blockchain for trading carbon credits would enhance security, transparency, and efficiency. Consequently, this examination examines how blockchain innovation would influence the fossil fuel by product exchanging and assist the members with taking on a drawn-out arrangement in discharge decrease. Carbon credits were established as a method to reduce greenhouse gas emissions by establishing a market where companies can trade emissions permits. Under the system, companies are allocated a certain number of carbon credits, which go less over time. Any excess can be offered for sale to another company. Businesses now have a financial incentive to cut their carbon emissions thanks to carbon credits. Individuals who find it challenging to reduce emissions can still run their businesses, but it will cost them more. According to supporters, the carbon credit system leads to quantified, independent emission reductions.

Keywords: Blockchain, carbon credit, emission reduction, greenhouse gas, carbon offset

INTRODUCTION

Blockchain has captured the attention of many sectors as an incorruptible digital ledger technology that is decentralized, distributed, and capable of storing any information securely. Bitcoin, the first-ever blockchain application, played a significant role in popularizing this technology.

Soon after its arrival in 2009, organizations realized that blockchain technology could be used for more than just digital currencies. Even global institutions like the UNFCCC (United Nations Framework Convention on Climate Change) secretariat recognized the potential of blockchain technology.

Several developed countries, such as the United States, United Kingdom, and Canada, have been at the forefront of blockchain technology's advancement and its applications in various fields, such as financial services, health care, and smart property. India has also joined the ranks of countries actively researching blockchain technology. This disruptive innovation of the Internet era is expected to revolutionize data storage and information transmission.

The unique characteristics of blockchain technology can significantly disrupt the carbon credit market, which is a tradable certificate or

*Author for Correspondence

Sweety Sharma
E-mail: ssweety2504@gmail.com

¹⁻²Student, MCA, Thakur Institute of Management Studies, Career Development & Research (TIMSCDR), Mumbai, India

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permit that certifies a certain amount of carbon dioxide emissions or the equivalent amount of another greenhouse gas has been authorized.

Carbon credits, otherwise called carbon balances, are licenses that permit the proprietor to transmit a specific measure of carbon dioxide or other nursery gases. One credit allows the emanation of one ton of carbon dioxide or the same in other nursery gases.

The carbon credit is half of a supposed cap-and-exchange program. Organizations that contaminate are granted credits that permit them to keep on surveying pollution up to a certain limit, which is reduced periodically. Meanwhile, the company may sell any unnecessary offsets to another company that needs them. Private companies are thus doubly incentivized to reduce greenhouse emissions. To start with, they should burn through cash on additional credits on the off chance that their emanations surpass the cap. Second, they can bring in cash by decreasing their outflows and selling their overabundance stipends.

Defenders of the carbon credit framework say that it prompts quantifiable, evident outflow decreases from ensured environment activity tasks, and that these ventures diminish, eliminate, or stay away from ozone harming substance (GHG) discharges. In December 2015, the Paris Understanding brought all countries into a typical reason to embrace aggressive endeavors to battle environmental change. It expected all gatherings to consent to invest their best amounts of energy through broadly resolved commitments. At the public level, policy makers have three choices to decrease ozone depleting substance outflows: (1) put forth a particular line that an organization can't exceed (2) present a carbon charge where the organization pays for how much CO₂ they produce, (3) execute an emanation exchanging plan to make a carbon market. The last arrangement has been getting some decent forward momentum as of late in view of the positive consolation of clean makers of energy and boosting the Petroleum product industry to turn out to be more proficient and gradually reduce their emissions. This prompted the production of carbon credits.

A carbon credit is a type of permit or certificate that can be traded, and it grants the right to emit one metric ton of carbon dioxide or an equivalent amount of another greenhouse gas. There are currently two distinct types of carbon credits available: voluntary emissions reduction (VER) credits and certified emissions reduction (CER) credits (Figure 1).

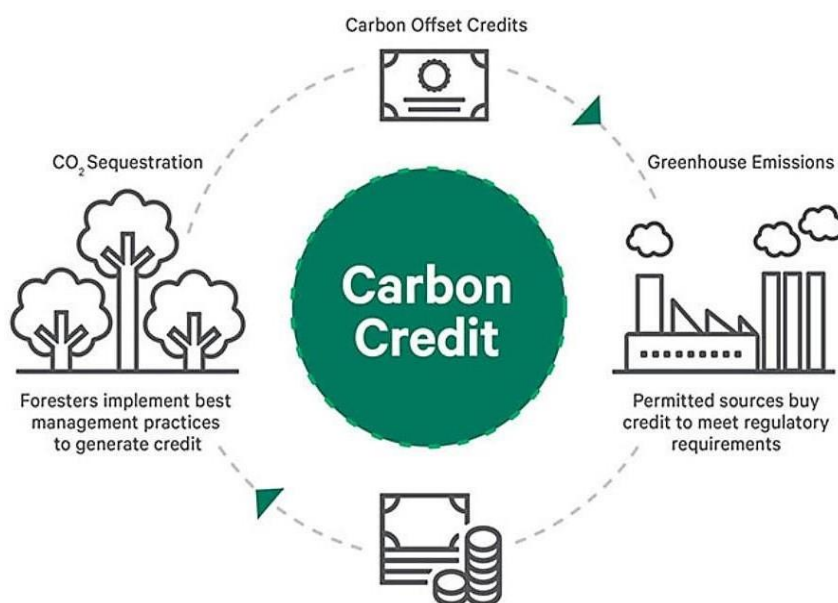


Figure 1. Carbon credit cycle.

VER credits are carbon offsets that are typically traded in the voluntary or over-the-counter market for credits. On the other hand, CER credits are confirmed outflows decrease units, or credits, that are generated through an administrative structure that is fully committed to balancing an organization's emissions. The primary difference between these two types of credits is that CER credits are managed by a third-party entity, whereas VER credits are not.

LITERATURE REVIEW

The advancement of low-carbon economy has incited an ever-increasing number of researchers to zero in on the connection between outflows requirement and activities the executives. An enormous piece of the writing is dedicated to concentrating on impacts of the emanations exchanging instruments on miniature activity choices of makers. Interim, taking into account carbon saving benefits of remanufacturing exercises, some literature:

1. This article investigates the streamlining plan of carbon exchanging China in light of a clever energy-saving and discharge decrease framework with carbon cost requirements [1].
2. This investigation discovered that India has an extraordinary chance to lessen ozone depleting substances and supply abundant CO₂ in the global carbon market. However, the investigation discovered that India will stay in the second position after China in the Carbon credit exchange 2030 [2].
3. EDGAR is a multipurpose, free, worldwide data set of anthropogenic outflows of ozone harming substances and air contamination on the planet. EDGAR gives free discharge gauges contrasted with what is revealed by European Part States or by Gatherings under the Unified Countries System Show on Environmental Change (UNFCCC), utilizing global measurements and a steady IPCC procedure [3].
4. Cost covers have been drifted by Congressperson Jeff Bingaman of New Mexico, executive of the Energy and Normal Assets Board of trustees, who has recommended a supposed well-being valve arrangement to forestall the cost of carbon exchanging from ascending excessively high [4].
5. It plans to go about as a middle person among government and industry to work with exchange of carbon credits, which would infer expanded carbon impartial development, Dabkara said. The lower place of parliament passed an Energy Preservation (Alteration) Bill 2022 in August that looks to lay out carbon exchanging. Under a carbon exchanging plan, government and confidential elements can procure carbon credits by diminishing [5].
6. This article discusses nonlinear programming models under which grandfathering and benchmarking are built. Impacts of the carbon credits repurchase strategy on remanufacturing choice are introduced. Impacts of portion rules on the adequacy of the carbon credits repurchase strategy are investigated. Impacts of discharges decrease in the assembling or it is examined in the remanufacturing process [6].

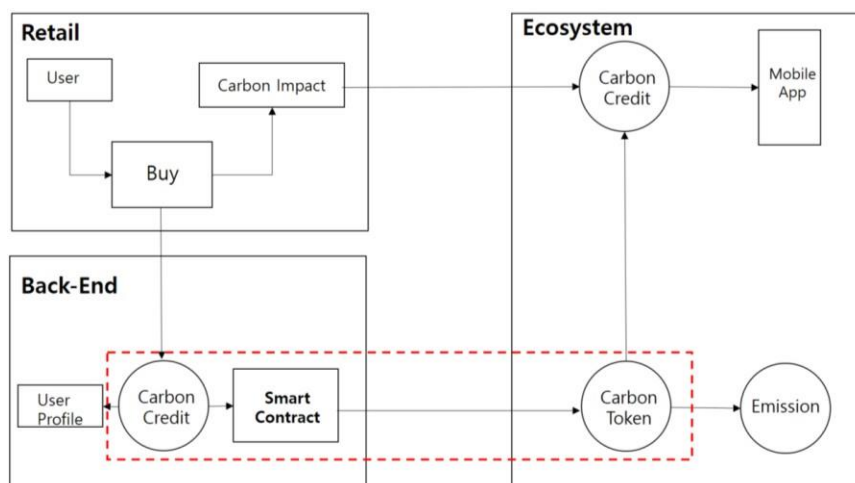


Figure 2. Smart renewable energy and P2P (Peer-to-Peer) blockchain service.

7. The emanation decreases objectives, goals, and technique framed here articulate an upgraded desire which, particularly whenever shared by other observatories, can assume a part in speeding up Hawaii's progress to a green economy and add to moving stargazing to a greener future [7].
8. The great pipeline of carbon market balances that safeguard a country's regular assets while creating income to address other economic improvement objectives, it ought to be nothing unexpected that respectability, among all things, is the basic fixing to all the kind of arrangements. Indonesia ought to zero in on working on the respectability of its carbon market. Formalizing the common standards of carbon credit characteristics is a key stage, especially on REDD+ credits where uprightness issues can happen at the hour of credit creation bringing about doubt over the nature of the discharge decrease claims (Figure 2) [8, 9].

RESEARCH METHODOLOGY

The world is parted into four sets. The 100 respondents from the highest carbon emission sectors were nominated randomly. They are as follows.

Table 1. Sample of respondents.

Highest carbon emission sector	Sample of responses	
	Percentage of carbon emission to total carbon emission	Respondents
Iron and steel	72	53
Transport	6.8	7
Electricity	28.4	20
Agriculture	27.6	20
Total		100

Source: Ministry of Environment and Forestry report.

To ensure trustworthy responses from the participants, validated scales were utilized for data collection. The survey tool used in this study to measure the respondents' attitudes toward global warming as the independent variable [10]. The secondary data regarding carbon credit trading and carbon emissions were obtained from published reports and articles (Table 1).

RESULT AND DISCUSSION

The figure below presents the demand for EE certificates in International VCMs.

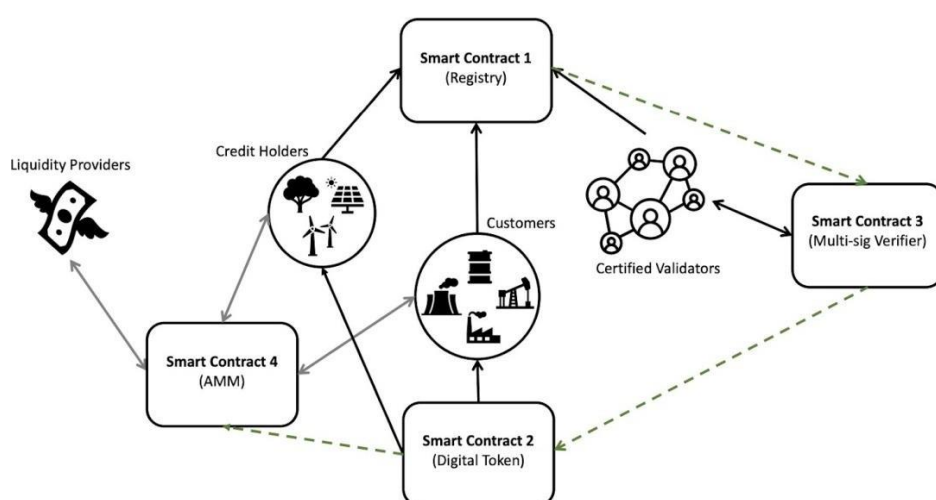


Figure 3. Flow diagram showing the proposed carbon credit ecosystem on a blockchain.

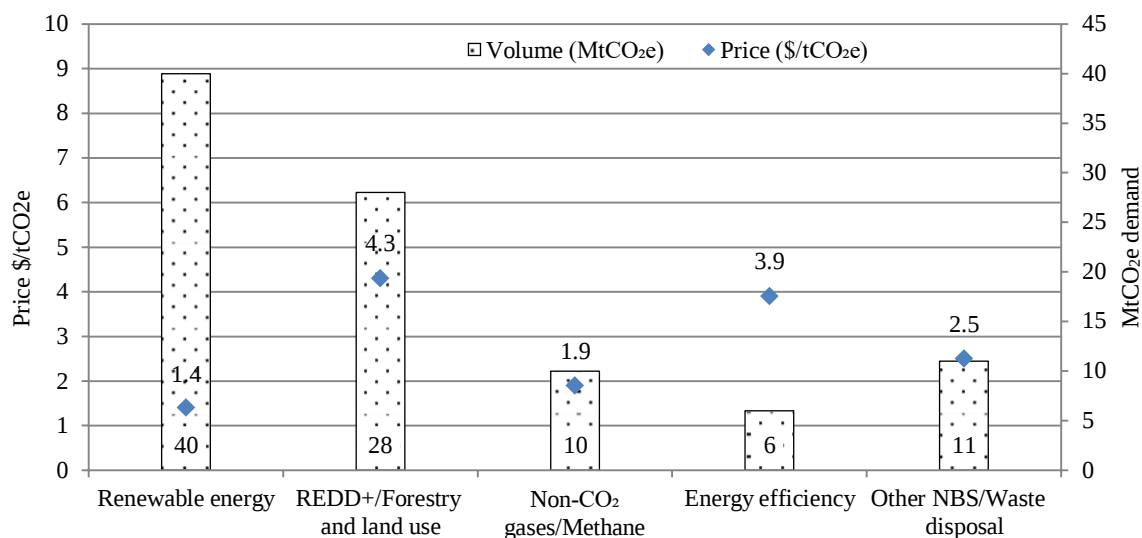


Figure 4. Carbon credit prices and demand 2019 (average of wholesale and retail prices).

The ESCerts are not named as far as GHG decreases, which is the accepted exchanging unit of most consistent based as well as Willful carbon markets all over the planet. Additionally, the intentional discharge decrease responsibilities taken by corporates in India and all over the planet on SBTi/CDP are in wording of CO₂ discharge decrease (Figure 3).

Fostering an arrangement for fungibility of the unit exchanging from energy saving to outflow decrease may draw in deliberate purchasers (and in ongoing dealers, whenever expected) to partake in ESCerts market, as it would make the exchanging instrument more fungible (in the short and medium term) and in the drawn out this may lead to global cooperation in the market as the reception of the instrument increases (Figure 4).

CONCLUSION

The benefits of using blockchain technology in the energy sector, specifically in relation to exchanging fossil fuel waste products, are evident. While the carbon market has reached a certain level of maturity, there is still a long way to go in terms of developing and implementing blockchain technology. The complexity of the energy system requires significant analysis, policy support, and expertise. Moreover, the current state of blockchain technology presents challenges in terms of computing power and response speed. India has committed to reducing its emissions by 33% to 35% below 2005 levels by 2030 under the Paris climate agreement, and a new nationwide carbon market is essential to achieving this target.

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