

Bridging Blockchain and Climate Action: How On-Chain Carbon Credits Align with COP30 Goals

Climate change refers to long term changes in temperature, weather patterns and atmospheric conditions and is one of the most critical challenges faced by humanity today. Although natural factors play a role in climate change, the crisis faced by us today is mainly the result of human activities. As per the world meteorological department growth rates of carbon dioxide have tripled since the 1960's which could result in displacing hundreds of millions of people due to climate related events by 2050.

To curb the greenhouse emissions, which are a major contributing factor to climate change, a carbon credit proposal was developed by the Intergovernmental Panel on Climate Change in 1977, the Kyoto Protocol, which outlines quantitative emission reduction targets for developed countries encouraging compliance via economic penalties or rewards. One of the key features of this protocol is the inclusion of a "Clean Development Mechanism" focusing on the development of cost-effective methods to curb greenhouse gas emissions. Like its predecessor the 2015 Paris Agreement also establishes emission standards and permitted emission trading. The Agreement also requires both developed and developing nations to regularly submit "Nationally Determined Contributions" which requires each country to explain the actions it will take to combat the threat of climate change.

The carbon market functions in two ways, as a compliance market where governmental organizations put a limit or "cap" on the emissions produced by specified industries and assign credits that represent the allowed emission limits. When a company exceeds the limit they must buy more credits, however if the emissions are lower than allowed, they can sell the extra credits. Hence, incentivizing limiting carbon emissions. Or through voluntary market carbon credits, which are projects taken up to reduce greenhouse emissions, which involves preserving rainforests or planting trees on barren lands, the credits can then be purchased by businesses that are responsible for higher emissions.

However, a question to consider is, how does carbon trading take place? These again can be divided into two types, off chain carbon trading and on chain carbon trading. In the traditional or off chain model the credits are issued by third party registries like Verra, Gold Standard or Climate Action Reserve. These organizations are responsible for verifying the reduction in emissions by projects and then issue credits on that basis. Typical buyers of these credits often include institutional investors, brokers and corporations that can purchase them in specialized marketplaces or over the counter.

Although this is the most commonly used model it falls short in many ways. As many registries cannot be accessed by the public or are difficult to audit it often results in a lack of accountability and transparency. Adding to this there are different types of registries with their own standards and protocols in place leading to confusion and an absence of standard procedure with a unified global registry that can be tracked and accessed easily, that also raises questions over the price, quality and credibility of the credit. Another issue is that of

double counting and the presence of middlemen in the procedure that makes it both slow and costly.

On the contrary the second method of “On Chain Carbon Trading” here the blockchain technology is used to tokenize the carbon credits, which can then be traded on a decentralized platform. Once the credit is on the blockchain it can be traded, retired or held using smart contracts. Providing full transparency as the ledger is immutable and every transaction that takes place is recorded making it possible to trace the entire life cycle of the credit. Making the transaction tamper proof, adding to the environmental impact. The system also lowers costs as it removes the need for middlemen and administrative expenses as the transactions take place automatically. This process is fast and accessible to anyone around the globe. Lastly, the automation ensures that the credits are not double counted enhancing trust and at the same time allowing real-time “Monitoring, Reporting and Verification” providing immediate updates on performance and emission reductions.

Now that the COP30 is set to take place in Brazil in November, it is expected that the focus is going to be on compliance with Article 6 of the Paris Agreement aiming for stronger global carbon markets and transparency in global emission reporting. Keeping in mind the comparison provided above blockchain based carbon trading solutions take center stage in supporting these ideals. Through supporting data harmonization and cooperation as is already being done by platforms like Polygon, Celo and Solana. Apart from that tokenized carbon credits allow additional benefits through fractional ownership, leading to greater liquidity that can be used to gather finances for community led projects or developing countries. At the same time ensuring equitable and just transition principles by supporting local projects and directly incentivizing indigenous communities and farmers for example projects on Regen Network that directly reward land stewards. Hence, to conclude blockchain based carbon credit projects are vital to achieve an equitable, transparent and scalable global carbon market.