Celo Foundation

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How Celo and the Climate Collective Can Help Scale the Voluntary Carbon Market

Scaling Voluntary Carbon Markets
Through Open Blockchain Platforms
celo

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Access to the Voluntary Carbon Market (VCM), which plays a crucial role in the global effort to combat climate change, is typically limited to large organizations and characterized by opaque pricing and market inefficiencies. Integrating the VCM with open blockchain platforms would allow individual-level access to the VCM, and enable more efficient carbon markets. This would create new capital flows for project developers while also increasing transparency across the entire supply chain.

In a recently published white paper, *Scaling Voluntary Carbon Markets Through Open Blockchain Platforms*, cLabs partner Slobodan Sudaric, the Celo Foundation's Jake Leraul, and Seth Baruch, CEO of clean energy consultancy Carbonomics discuss ways to bridge the gap between the VCM and blockchain, address some of the challenges and opportunities, and recommend approaches for carbon-blockchain integration. This blog post summarizes the main points of their paper.

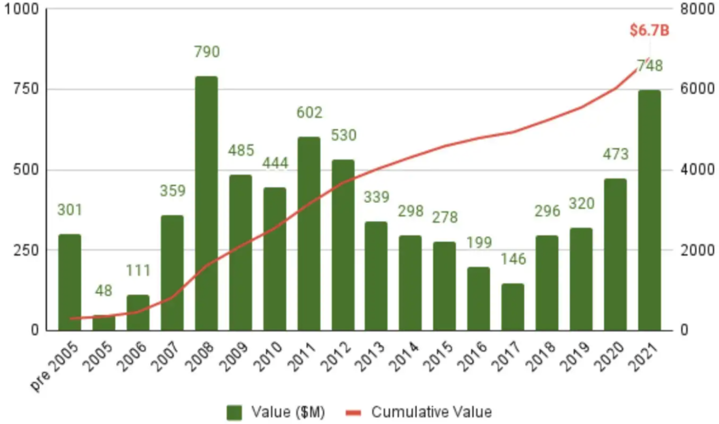
The Origins of the VCM

While a voluntary offset market existed before the Kyoto Protocol was ratified in 2005, that treaty's Clean Development Mechanism (CDM), which established a market for the trading of emissions between developed and developing countries, triggered a huge flow of corporate capital into global projects designed to remove greenhouse gasses (GHGs) from the atmosphere.

The CDM generated tens of billions of dollars for GHG-reduction projects, but the market collapsed due to the effects of the 2008 financial crisis and a lack of a follow-on agreement when the Kyoto Protocol expired in 2012. The Protocol was replaced by the voluntary market and regional compliance programs, although few of those programs promoted cross-border emissions trading.

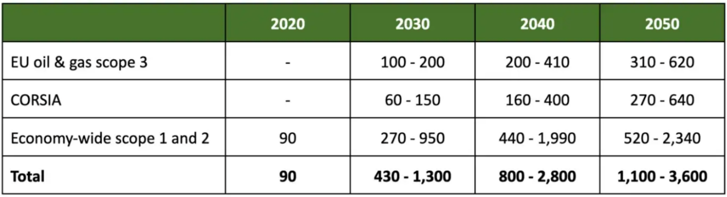
The VCM was relatively quiet between 2012 and 2017, but it re-emerged strongly in 2018 when its volume doubled to reach $296 million. According to the latest figures published by analytics firm Ecosystem Marketplace, the value of the market likely exceeded $1 billion in 2021.

Market Size by Traded Value (pre-2005 to Aug 2021)



Source: Ecosystem Marketplace, 2021, Markets in Motion — State of the Voluntary Carbon Markets 2021, p. 3. Includes Chicago Climate Exchange-traded offsets; 2021 includes values until 31 August.

Looking ahead, University College London and Trove Research forecast that demand for carbon offsets will increase to between 1.1 billion and 3.6 billion tonnes per year by 2050. For context, the cumulative demand from 2005 to 2021 was just over 1.7 billion tonnes.



	2020	2030	2040	2050
EU oil & gas scope 3	-	100 - 200	200 - 410	310 - 620
CORSIA	-	60 - 150	160 - 400	270 - 640
Economy-wide scope 1 and 2	90	270 - 950	440 - 1,990	520 - 2,340
Total	**90**	**430 - 1,300**	**800 - 2,800**	**1,100 - 3,600**

Source: Trove Research, 2021, Future Demand, Supply and Prices for Voluntary Carbon Credits — Keeping the Balance, p.15.

Unfortunately, this rise in demand alone won't halt climate change. Opening up the VCM broadly to the public and improving market efficiency is vital — and that's where open blockchain platforms factor in.

VCM and Blockchain — The Story So Far

A relatively small share of the crypto market is now directed to VCM activity, but given the current size of that market, crypto could help immensely in the fight against climate change. Here are three ways blockchain technology and the VCM are already working together.

Layer 1: Creating and issuing tokenized credits

Most buyers of carbon credits purchase credits issued by established registries because they trust systems refined over many years. For example, a project developer goes through a third-party audit to verify its emission reductions when listing on Verra (the organization that operates the Verified Carbon Standard). Verra then issues credits, known as Verified Carbon Units (VCUs). These VCUs can be sold, banked, or retired on Verra's platform.

Several Web3 projects have developed 'bridges' to make those off-chain credits available on-chain, while preserving the integrity of the underlying credit and its issuing organization. Members of Celo's Climate Collective, for example, have developed solutions that move credits from established registries on-chain or generate an on-chain carbon credit twin that is synchronized with the original off-chain credit.

Layer 2: Market infrastructure

Carbon credit pricing is often opaque and illiquid in the traditional VCM, as projects are highly heterogeneous and prices are typically the result of bilateral negotiations. However, blockchain technology can improve tradeability, traceability, and liquidity. On-chain credits can be pooled based on common characteristics, such as a common vintage threshold or common methodology. This provides for open and liquid markets, while at the same time allowing for differentiated pricing, as multiple carbon pools can co-exist in parallel. This approach generates valuable price signals and can attract additional project developers.

Layer 3: Demand and market participants

Smart contracts allow carbon credits to be used in more complex and innovative ways, creating additional demand in the overall VCM. Let's look at Celo, a blockchain that has several stable assets — cUSD, which tracks the value of the U.S. dollar; cEUR, which tracks the value of the euro; and cREAL, which tracks the value of the Brazilian real. All are backed by the Celo Reserve, which holds a basket of crypto assets — bitcoin, ether, dai, and tokenized carbon credits. As demand for Celo stable assets increases, the Reserve purchases more credits. As of April 3, 2022, Reserve holdings total over $690 million, with up to 0.5% allocated to carbon credits. Through the Celo community's Climate Collective initiative, this allocation could expand substantially over the coming years.

The Pros and Cons of Leveraging Blockchain Technology

Understanding the opportunities and challenges presented by blockchain technology is key to successful integration of carbon credits.

Blockchain tech attempts to address the problems of double-counting and double-issuance, which have long hindered the VCM. The transparency provided by the blockchain allows anyone to track credit transfers and all of the associated transactions, including the issuance of new credits and transactions that ultimately retire (or burn) the credit tokens. Additionally, the nature of a public blockchain (i.e., individual blocks of public records are 'chained' to inception) makes it nearly impossible to transact in retired credits or to create new tokens out of thin air.

As noted above, established registries have been refining their standards for years, so some may be concerned about the impact on their credibility when carbon credits are pooled and traded on a common marketplace. However, a common marketplace means participants value the credits, providing useful price information (currently largely unavailable) to stakeholders at every stage of the supply chain.

Anonymity may concern registries accustomed to following ‘know your customer’ (KYC) requirements. But token solutions can involve KYC measures — for example, at the point of credit token issuance.

Finally, the legal status of digital assets is an ongoing topic of debate in the crypto and the broader financial communities. While consensus may be emerging that a token representing a VCU (in the case of Verra) can be treated the same as a VCU, additional complexity can arise when a token credit is embedded into more elaborate arrangements.

Next Steps

The authors of the white paper recommend that VCM stakeholders take four steps to advance the integration:

1. Assess how first-movers integrate the VCM and blockchain technology.
2. Educate VCM stakeholders and the broader public about the complexities of the VCM and how blockchain technology can help (e.g., participate in industry events and engage in constructive dialogue).
3. Agree on actions to protect the integrity of tokenized credits (e.g., incentivize analytics firms to audit market participants).
4. Establish standards in partnership with recognized industry bodies, such as the International Carbon Reduction and Offset Alliance.

To learn more about how blockchain technology can unlock access to the VCM for individuals, read the full white paper.

Celo is an open blockchain platform that makes financial tools accessible to anyone with a mobile phone. As a proof-of-stake (PoS) platform, it is highly energy-efficient, and with emission offsets at the protocol layer, it offers builders a carbon-neutral platform to build on. To learn more about Celo and the Celo community’s activities in the fight against climate change, visit the Celo website and the website of Celo’s Climate Collective.