

Will tokenization bring about sounder carbon credit markets?

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Executive Summary



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Tokenization initiatives to expand voluntary carbon credit markets and improve their liquidity have become increasingly common in recent years. Meanwhile, major voluntary carbon credit programs have been setting rules on tokenized credits. The ongoing rollout of regenerative finance models to navigate new risks bodes promisingly for voluntary carbon credit markets' future development.

Benefits of carbon credit tokenization

Regenerative finance (ReFi) initiatives have been growing in prevalence in recent years. ReFi seeks to leverage blockchain technologies within the financial sector to direct capital towards solving environmental and societal challenges such as mitigating climate change, preserving biodiversity and rectifying economic disparities. Most notably, ReFi has been increasingly driving growth in carbon markets through privately led tokenization of voluntary carbon credits¹⁾ (VCCs).

VCCs are earned by reducing or avoiding CO₂ or other greenhouse gases through such means as deforestation avoidance, afforestation/reforestation or renewable energy projects. VCCs can then be sold to third parties. Conversely, companies can opt to purchase VCCs to offset their irreducible greenhouse gas footprint²⁾. Once VCCs have been used to offset emissions, they are typically retired to prevent reuse but they need not be used immediately. They therefore can be tokenized and circulated like other cryptoassets. VCCs could be tokenized in small denominations of, say, less than one tonne to make them affordable to more companies and even individuals. Tokenization should also improve transparency by allowing information such as project details and transaction histories to be recorded on the blockchain.

Innovators such as Toucan, a company dedicated to decarbonization, and KlimaDAO, a decentralized autonomous organization (DAO), have been experimenting with creative tokenization approaches that dramatically change VCCs' marketability. Toucan and KlimaDAO issue fungible tokens that, instead of being tied to a single project, are backed by VCC pools encompassing a diverse assortment of projects. This approach delinks tokens from projects' idiosyncrasies,

NOTE

1) See <https://www.nri.com/-/media/Corporate/en/Files/PDF/knowledge/publication/lakyara/2023/01/lakyaravol364.pdf>.

2) In addition to offsetting emissions on a company-wide basis, companies sometimes offset emissions associated with a specific product or service to market the product/service as carbon-neutral.

thereby sparing prospective purchasers from having to screen individual projects, reducing the risk of dependence on any single project and, in turn, enhancing the tokens' liquidity. Another advantage of VCC pools is they obviate the need for advisors or brokers to help select VCCs, sparing project developers from having to pay such intermediaries' fees. Use of VCC pools consequently should increase projects' cost-efficiency.

Major certifiers' restrictions on tokenization and new framework

While VCC tokenization has been growing briskly, it arrived at an inflection phase in 2022. In May 2022, Verra and Gold Standard (GS), operators of two of the most liquid and widely used carbon crediting programs in the world, announced policies prohibiting tokenization of retired VCCs³⁾, a practice employed by Toucan, among others. They did so out of concern that circulation of tokens representing retired VCCs would render them unable to track who had used the VCC to offset emissions. Additionally, both Verra and GS reiterated previous warnings that retired VCCs have no environmental benefit and that using their VCCs to back new products without their consent is a violation of their terms of use.

3) To prevent double-use, Toucan had previously been retiring VCCs upon tokenizing them.

Verra and GS then published consultation papers on tokenization of their respective VCCs in August and September 2023, respectively. The papers propose that tokenized VCCs within Verra and GS's respective registries be transferred to a custodial account and/or immobilized to prevent them from being used more than once⁴⁾. They also propose synchronizing information between token platforms and their registries to ensure that VCCs are retired when the token associated with the VCC is "burned."

4) The VCCs would be custodied in a separate account, not retired, so tokenized VCCs could be turned back into off-chain credits if the purchaser wished to do so.

In addition to the retirement issue, another concern is qualitative degradation of pooled VCCs. Because pooling impedes visibility into individual projects, there is a risk of pools containing VCCs backed by low-quality projects unbeknownst to token purchasers. To prevent qualitative degradation of VCC pools and other improprieties, authorities are discussing imposing eligibility criteria on token originators and stricter KYC requirements on token trading platforms⁵⁾.

5) At the time of this writing (April 2023), Verra and GS are finalizing proposals on these matters.

Example of qualitative degradation due to pooling

KlimaDAO was involved in an interesting case of VCC qualitative degradation.

6) KlimaDAO had been issuing tokens backed by Toucan's Basic Carbon Tonne (BCT) token. At the time, all VCCs certified by Verra since 2008 were eligible for inclusion in Toucan's BCT pool. HFC-23 tokens consequently found their way into the BCT pool. Once Toucan became aware of the problem, it blacklisted HFC-23 credits.

7) The Kigali Amendment to the Montreal Protocol banned HCFC-22 in developed countries effective from 2020 and in developing countries effective from 2030.

8) KlimaDAO's pools reportedly contain other old, low-quality credits, albeit to a lesser extent than the HFC-23 credits.

When first launching its service, KlimaDAO planned to form VCC pools composed entirely of VCCs certified as meeting certain quality standards by Verra, the largest carbon crediting program. However, some VCCs previously certified by Verra were earned by destruction of HFC-23 (trifluoromethane). HFC-23 credits are ranked as the lowest-quality credits. A large amount of them found their way into KlimaDAO's pool⁶⁾. The tokens backed by the pool were consequently of low-quality.

HFC-23 is a byproduct of HCFC-22 (chlorodifluoromethane), a gas previously used mostly as an air-conditioner refrigerant⁷⁾. Although it is 14,800x more potent than CO₂ in terms of greenhouse effect, HFC-23 can be destroyed relatively cheaply. Some companies in developing countries were needlessly producing HCFC-22 just to acquire HFC-23 credits, perversely causing atmospheric concentrations of HFC-23 to rise. In response, a number of carbon credit authorities, including Verra and the EU Emissions Trading System, stopped certifying HFC-23 credits. Today, new HFC-23 credits are no longer generated this way.

Previously certified HFC-23 credits consequently came to be regarded as the lowest-quality credits. Unable to attract buyers, they became practically unsalable until tokenized VCC pools emerged as new buyers of VCCs. VCC pooling imparted a veneer of ostensible economic value to these lowest-quality VCCs that should have been worthless in the marketplace.

The most noteworthy aspect of this story is KlimaDAO's response to the HFC-23 tokens in its pool. As its name implies, KlimaDAO is a DAO governed by governance tokens. An 83% supermajority of its community members voted in favor of rectifying the pool's quality by burning 672,000 tokenized HFC-23 credits to rid the pool of them, with KlimaDAO bearing the resultant loss⁸⁾.

As this example illustrates, VCC tokenization schemes potentially entail risks if ill-designed. In this case, however, ReFi tools (tokenization and DAOs) were able to purge the lowest-quality VCCs from the pool and restore the market to sound footing. While new technologies come with new risks, the case of KlimaDAO's HFC-23 credits is a good example of helping to solve an environmental/societal challenge by adroitly navigating such risks.

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