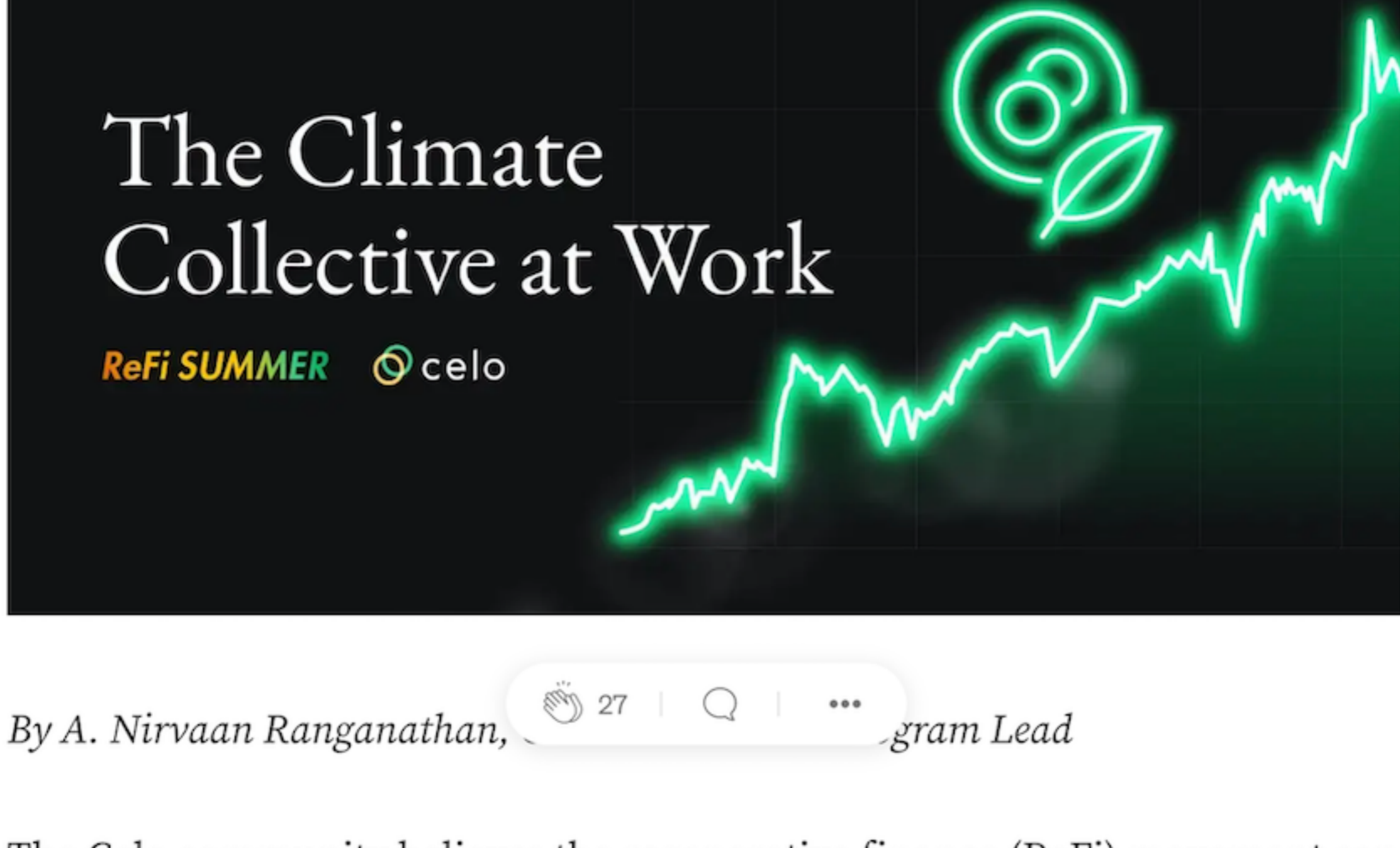


How the Climate Collective Helps Increase Liquidity, Transparency, and the Integrity of Carbon Credit Markets



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The Celo community believes the regenerative finance (ReFi) movement can help reverse the effects of the climate crisis and heal our planet. Currently, ReFi's most prominent use case is carbon offsetting, which is the act of compensating for the harmful greenhouse gas emissions (GHGs) of both organizations and individuals. Offsets play a crucial role in the battle against climate change, as recognized by the 2015 Paris Accord and its predecessor, the Kyoto Protocol, the first agreement to call for a reduction in greenhouse gasses.

Today, blockchain technology is a driving force of this use case, as it tokenizes carbon offset credits and aids in overcoming several challenges that currently limit the effectiveness of Voluntary Carbon Markets (VCMs): access by individuals, insufficient liquidity, lack of transparency, and questionable practices. Integrating VCMs with Web3 will also help the Celo community realize its vision of a holistic regenerative financial system with natural assets at its heart.

What Are Voluntary Carbon Markets?

Before exploring the different ways blockchain technology can enhance VCMs, it's important to understand what VCMs are and how the carbon offset credit supply chain works.

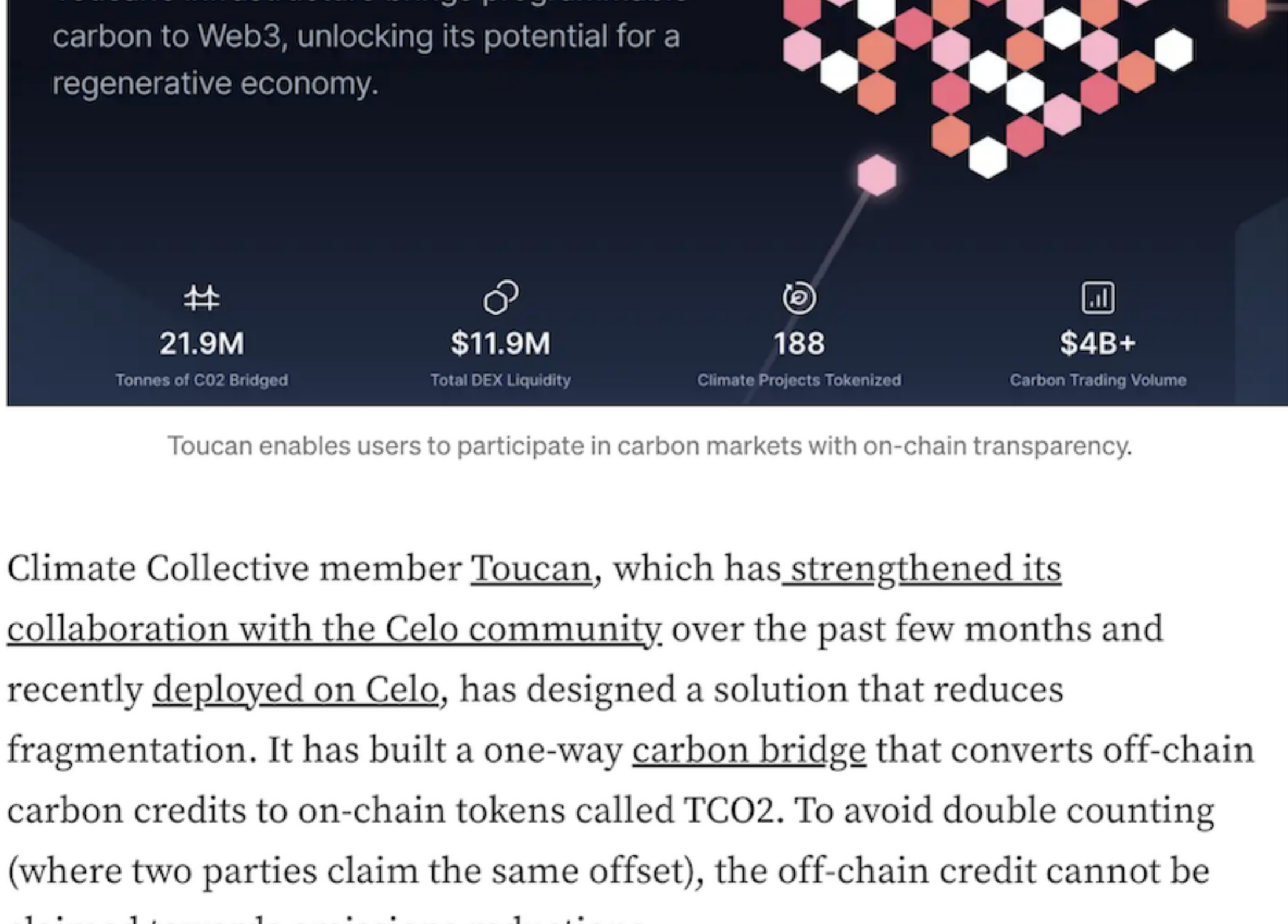
VCMs enable carbon emitters to offset their GHGs by buying carbon credits from projects that aim to reduce or remove GHGs from the atmosphere. These projects, which are related to forestry, renewable energy, or waste, are created by carbon offset project developers. Using measurement, reporting, and verification (MRV) data, carbon registries validate the claims and issue corresponding credits. Carbon offset brokers price the credits and sell them to institutions, which then trade or retire them (remove them from the market) to claim the offset and help compensate for their overall carbon footprint. Importantly, once credits are removed from circulation, they can no longer be sold or traded.

Creating More Effective VCMs

VCMs harness some of the key benefits of blockchain technology, such as the visibility and traceability of tokenized assets (in this case carbon credits) to boost liquidity, transparency and integrity.

Increase In Liquidity

Fragmentation in VCMs restrains deep liquidity. Each carbon credit in the markets represents a specific project defined by attributes, such as type, country of origin, and vintage year, that often influence price. Individually, these credits are illiquid. Brokers have to match carbon credit developers with end users. It's an inefficient model because it's time-consuming and adds transaction costs.



Toucan enables users to participate in carbon markets with on-chain transparency.

Climate Collective member Toucan, which has strengthened its collaboration with the Celo community over the past few months and recently deployed on Celo, has designed a solution that reduces fragmentation. It has built a one-way carbon bridge that converts off-chain carbon credits to on-chain tokens called TCO2. To avoid double counting (where two parties claim the same offset), the off-chain credit cannot be claimed towards emissions reductions.

Holders of TCO2 tokens can add them to Toucan's Base Carbon Pool or Nature Carbon Pool. These pools consist of carbon credit tokens with similar attributes; the Base Carbon Pool accepts credits from any type of Verra-certified project launched since 2008, while the Nature Carbon Pool is more restrictive, only accepting credits from nature-based projects launched after 2012. Holders receive pool reference tokens in return — either Base Carbon Tonne (BCT) tokens or Nature Carbon Tonne (NCT) tokens. Both can be traded on decentralized exchanges (DEXs) or used as building blocks in decentralized finance apps. The ability to tap into the deep liquidity of DEXs allows anyone to buy large volumes of tokens without facing wide price spreads or slippage. This is important to ensure carbon-intensive institutions can efficiently acquire and retire carbon offsets in bulk.

Another restraint on liquidity is the format of VCM transactions when they take place 'over the counter' (OTC) as opposed to via an exchange. With OTC transactions, the information available to end users to calculate the value of a credit is limited. But BCT and NCT are listed on DEXs, such as Sushiswap, which provide market signals and enhance price discovery by allowing the market to decide how much a credit is worth, rather than an intermediary like a broker.

Increase In Transparency

As noted above, off-chain carbon credits pose a double-counting problem for VCMs. One Web3 project working to solve that problem is Astral Protocol, a Climate Collective member. Astral's Geolocker tool allows entities to claim ownership of a geographic zone by recording its data in smart contracts. For example, a VCM registry could use Geolocker to link a patch of forest to a particular credit, which prevents another registry from claiming the same patch, thereby preventing double counting.



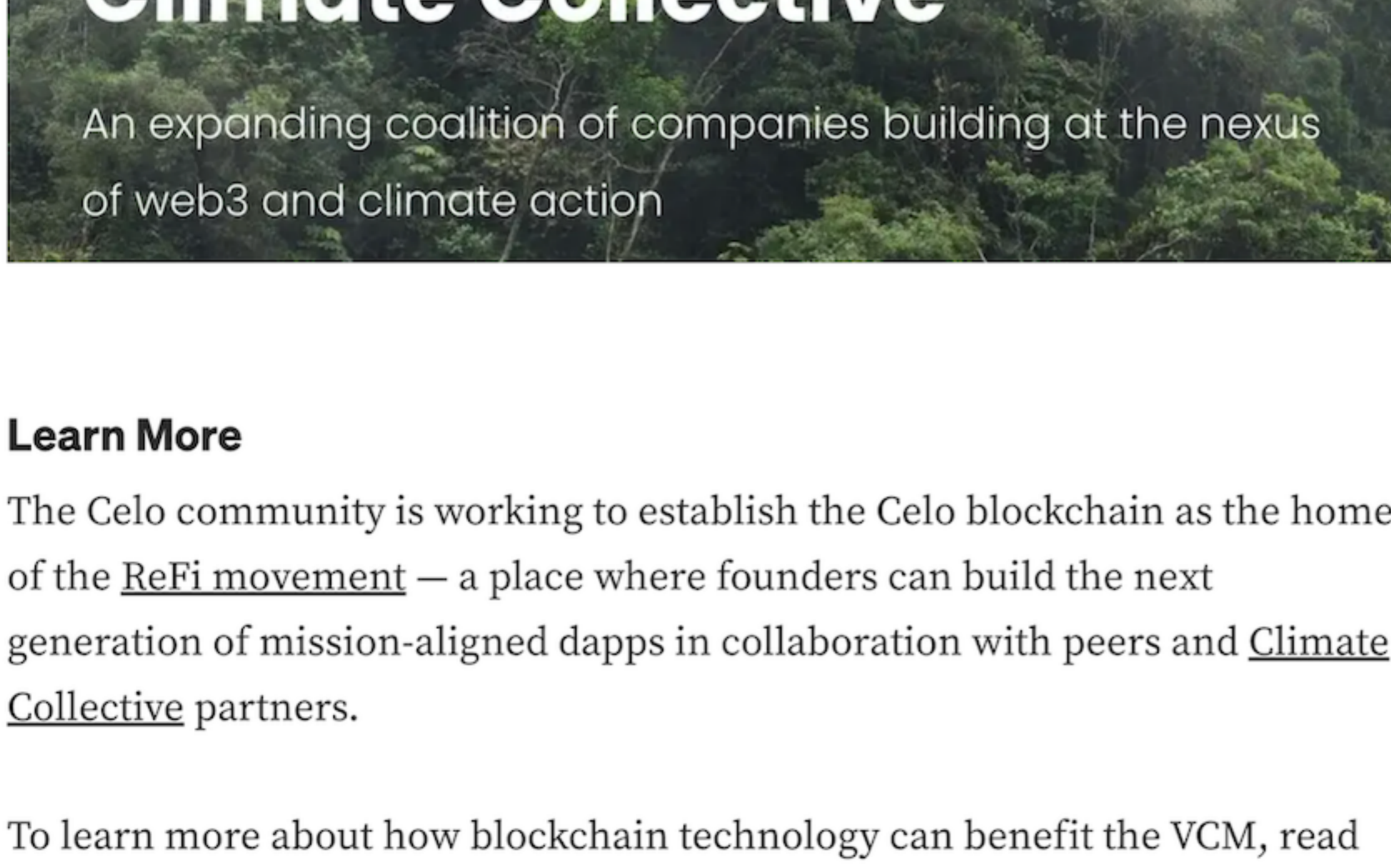
Additionally, because blockchain data is visible to anyone, transparency is improved. A carbon credit becomes much easier to track once it's converted to a token. Anyone can see who owns it, when it was last traded, and when it was retired. Incidentally, a smart contract could be programmed to pay a royalty each time a tokenized credit is traded on the secondary market, ensuring that those who generate the value captured in a carbon credit benefit from subsequent financial transactions by external market participants.

The immutable nature of blockchain data offers further reassurance to users, as they can track a credit back to its source project.

Increase in Integrity

Traditionally, measuring, reporting, and verifying carbon credit projects involve manually assessing the amount of carbon sequestered by using a handheld meter, for example. This approach is inefficient, costly, and has not scaled to meet the demand from the carbon markets. Three of the leading carbon registries (Verra, Climate Action Reserve, and the American Carbon Registry) are based in the United States, while the majority of carbon projects are based in developing countries thousands of miles away.

A range of digital technologies can help solve these issues by making MRV more efficient and accurate. Sensors, including smart meters and drones, capture carbon sequestration data from the source, while artificial intelligence (AI) technology processes that data and spots errors or flags fraudulent behavior. earthbanc, a climate fintech built on the Regen blockchain, another Climate Collective member, audits carbon projects in real time by using AI algorithms to interpret satellite imagery (provided by the European Space Agency) of forests. It then stores the audit data on Regen.



Learn More

The Celo community is working to establish the Celo blockchain as the home of the ReFi movement — a place where founders can build the next generation of mission-aligned dapps in collaboration with peers and Climate Collective partners.

To learn more about how blockchain technology can benefit the VCM, read Scaling Voluntary Carbon Markets Through Open Blockchain Platforms, a whitepaper written by cLabs Partner Slobodan Sudaric; Jake Leraul, a Legal Partner at the Celo Foundation; and Seth Baruch, CEO of clean energy consultancy Carbonomics.

To join the Climate Collective and apply for grants available to founders, visit climatecollective.org.