

## **Re: Consultation – Conditions for Consenting to Tokenisation of Gold Standard-Issued Credits**

To Gold Standard Staff and Board:

Flowcarbon appreciates the opportunity to respond to Gold Standard's Consultation on the conditions for consenting to tokenization of its credits. This is a unique moment in the Voluntary Carbon Market ("VCM"), and we commend Gold Standard for its leadership in exploring the potential for blockchain technology to enhance and expand transparency and efficiency within the VCM. We welcome the opportunity to offer our thoughts on how to achieve these goals in a responsible and collaborative way. Flowcarbon strongly believes that the innovations of blockchain and smart contracts — and, in particular, the creation of digital representations of Verified Emission Reductions ("VERs") using blockchain technology (or, "tokenization") — have the power to unlock a new level of equitable access, transparency, and environmental integrity in the VCM.

Gold Standard's decades of respected work and considerable investment of resources in creating and improving its methodologies has established Gold Standard as a leading standard and registry in the VCM and, moreover, has helped fuel growth and adoption of the entire market. We therefore believe it appropriate that Gold Standard is at the forefront of establishing the rules and framework by which tokens can be appropriately adopted and leveraged in the VCM. Inherently, this involves striking a careful and thoughtful balance between the expanded market access and ease of use that make tokens ideal for scaling this market, while mitigating potential risks. Satisfying the demands of environmental integrity will require that the retirement of any VER is the final end-state of that VER and that one ton of carbon retired on-chain still remains one ton of carbon retired off-chain.

We believe that Flowcarbon is uniquely situated to assist Gold Standard through this submission for several reasons. First and foremost, our primary mission as a company is to enhance and scale the VCM with integrity and credibility, and we approach tokenization of VERs through that lens. Second, we have spent the last 12 months working diligently with longtime VCM lawyers, regulatory compliance specialists, anti-money laundering ("AML") specialists, and blockchain legal experts, to ensure that our approach to tokenizing VERs accomplishes our goal of enhancing and scaling the VCM while also standing on strong legal, reputational and regulatory footing. And third, we have taken great measures to collaborate and align our efforts with key VCM stakeholders, including as part of the International Emissions Trading Association's ("IETA") Task Group on Digital Climate Markets and Gold Standard's Working Group on Digital Assets for Climate Action, and through many bilateral sessions with representatives from the main standards.

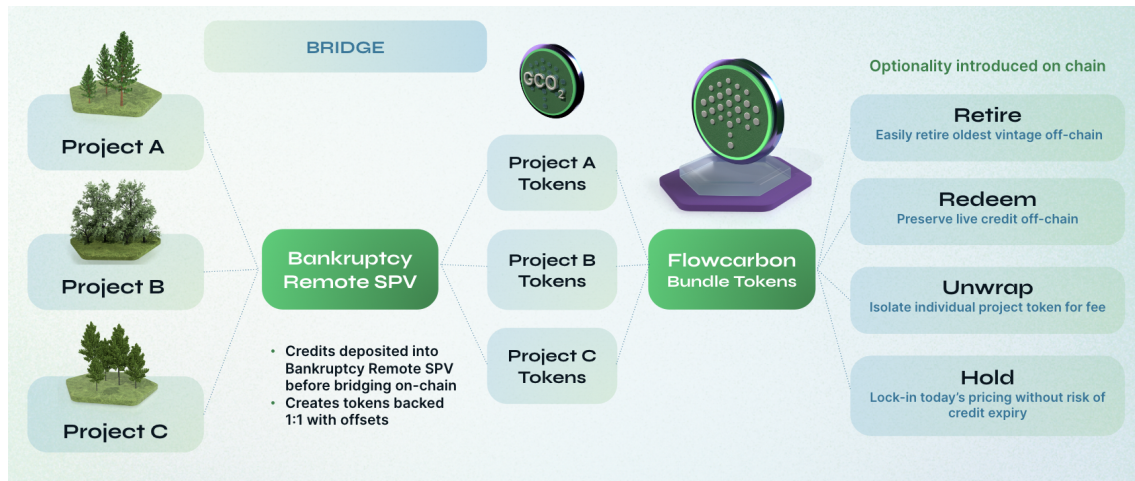
We are readily available for any follow-up questions, or to provide any additional information, and are happy to assist you in any additional way. Please find our responses to your specific questions below.

# Flowcarbon's Model

## Basic Architecture and Functionality:

Flowcarbon has created an open-source protocol (i.e. blockchain-based application) that enables the “tokenization” of VERs. The process is as follows:

1. First, VERs are issued in the normal course, pursuant to Gold Standard's project certification and credit issuance processes in accordance with one of Gold Standard's approved methodologies.
2. Then, a project developer wishing to “tokenize” the VERs would obtain from Flowcarbon our “Supply Partner Agreement,” created by carbon market experts at Latham & Watkins, which outlines contractually the obligations of Flowcarbon to the project developer.
3. After signing the agreement, the project developer would transfer some number of VERs to a Gold Standard account owned by an SPV that was created by Flowcarbon for the purpose of owning and managing the designated Gold Standard account into which VERs are transferred for tokenization (i.e. the “warehouse” account).
4. For every VER deposited into the warehouse account, Flowcarbon mints one “GCO2” token, which represents a specific VER on a one-for-one basis, and includes information regarding the project name, project ID, vintage and serial number.
5. Flowcarbon then delivers the GCO2 token back to the Supply Partner. Each VER backing a GCO2 token remains in the warehouse entity's Gold Standard account until one of two things happens:
  - a. Retirement: When a token holder wishes to retire an VER and claim the associated offset. The token is permanently altered to a “retired” state, and a notification is sent to the Flowcarbon team to retire an underlying credit from the Gold Standard warehouse account.
  - b. Redemption: When the token holder desires to take possession of a non-tokenized VER. The token holder can deliver the token to Flowcarbon, which destroys it, and a VER is transferred into the token-holder's Gold Standard account.

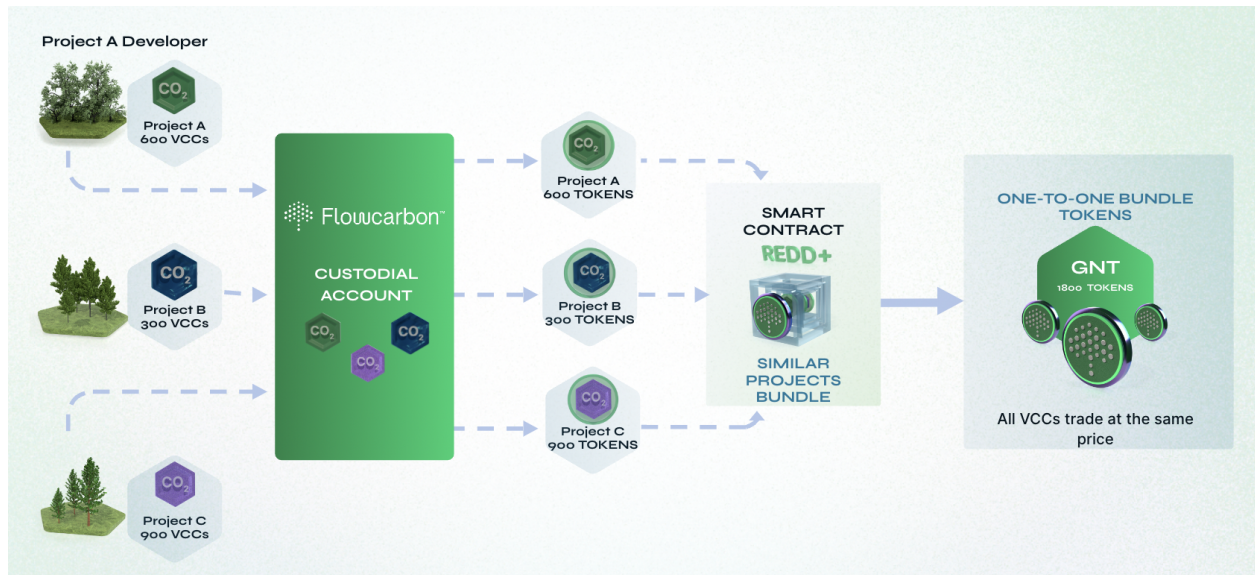


*Flowcarbon functionality overview*

### Token Bundling:

Flowcarbon's protocol also enables certain credits to be grouped together into more fungible "bundles." The process is as follows: Flowcarbon sets certain criteria for a particular bundle, and programs those criteria into a "smart contract," which is a program stored on a blockchain that runs when predetermined conditions are met. They are used to automate the execution of an agreement so that all participants can be immediately certain of the outcome, without any intermediary's involvement or time loss. In this case, the conditions are met when a Supply Partner transfers to the bundle smart contract GCO2s that meet the criteria for a particular bundle. Criteria can be broad or narrow, for example, all Gold Standard-issued VERs from a certain year, or any Gold Standard-issued VER from a Forest Carbon project in 2022, and so forth.

When the Supply Partner seeks to "bundle" her GCO2 tokens, she simply utilizes an easy-to-navigate Flowcarbon web interface which enables her to send her GCO2 tokens to the bundle smart contract. When the GCO2 tokens are received by the smart contract, it automatically sends back to the project developer the same number of tokens, but these are fungible "bundle tokens."



*Flowcarbon bundle overview*

Each bundle token represents the right to claim any one of the GCO2 tokens held in the “bundle,” creating fungibility among those GCO2 tokens (and the VERs underlying them). At any point, a bundle token holder may “unbundle” her bundle tokens for an equivalent number of GCO2 tokens then present in the bundle, via the Flowcarbon web interface. These GCO2 tokens, as noted above, can then be redeemed for the relevant underlying VERs.

The GCO2 tokens issued by Flowcarbon would be ERC-20 compatible and issued on the Celo blockchain, a Layer 1 blockchain utilizing a proof-of-stake consensus mechanism. Proof-of-stake mechanisms use 99.95% less energy than proof-of-work mechanisms and Celo has consistently been rated as one of the greenest blockchain networks. Celo has committed to environmental integrity, and has purchased offsets that exceed its historical emissions.

# General

## ***Do you agree that Gold Standard should explore and enable organisations to create digital tokens representing Gold Standard credits, using blockchain technology? Why?***

Flowcarbon agrees that Gold Standard should explore and enable organizations to create digital tokens representing Gold Standard credits.

As a fundamental principle, Flowcarbon believes that, unless there are material risks that cannot be reasonably mitigated, people should have the ability to participate in the VCM and contribute directly to carbon reduction and removal projects. 72% of individuals surveyed by Pew Research are very or somewhat concerned that climate change will personally harm them<sup>1</sup>, and want to do their part. In fact, 80% of individuals are willing to make changes to how they live or work to reduce climate change<sup>2</sup>, and on average are willing to part with \$31-\$129 per ton (from their household budget)<sup>3</sup>. In the absence of a sufficiently robust compliance scheme that guarantees that climate targets will be hit, the VCM may be the best opportunity people have to make a difference.

Given the options available, blockchain – and tokens in particular – are the best tool for expanding the market to all potential demand-side participants, including individuals, in a timeframe that is workable. This is because the infrastructure needed to use them, like wallets and exchanges, are already widely adopted by hundreds of millions of people and companies all over the world, including in the developing world, affording equitable and accessible participation globally. Thus, tokenization has the potential to benefit all parties in the carbon value chain.

Below, we outline in depth the benefits that tokenization enables to several key stakeholders in the VCM:

### Benefits to Developers & Local Communities

- **Greater efficiency and price transparency.** A fundamental challenge for project developers in the VCM is the lack of reliable, accurate pricing data for carbon credits. Tokenization solves this because blockchain transactions are public and therefore inherently transparent, offering clear pricing data for different types of credits, a key unlock for project developers as well as buyers.
- **Greater share of proceeds.** Instead of interacting with a web of intermediary networks or disparate platforms, buyers and sellers can come together directly through blockchain exchanges (i.e. Coinbase) that tens of millions of entities and people already use. Innovations like automated market makers not only create and incentivize a

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<sup>1</sup><https://www.pewresearch.org/global/2021/09/14/in-response-to-climate-change-citizens-in-advanced-economies-are-willing-to-alter-how-they-live-and-work/>

<sup>2</sup><https://www.pewresearch.org/global/2021/09/14/in-response-to-climate-change-citizens-in-advanced-economies-are-willing-to-alter-how-they-live-and-work/>

<sup>3</sup><https://www.rff.org/news/press-releases/multi-country-surveys-a-decade-apart-show-increased-willingness-to-pay/>

well-functioning and accessible market, but also reduce the extractive role of intermediaries, allowing more money to go to carbon project developers and communities. Flowcarbon's tokenization model is an open platform that can be used by anyone with credits to tokenize for a small fee (2% to cover platform fees) and then sell directly to buyers with no opportunity for margins to be added by any entity sitting in the middle.

- **Potential for higher prices and launching more projects.** Making carbon credits accessible to more individuals and businesses should lead to increased demand. In the short-term, given the time lag to bring new projects online, this should lead to increased prices. There are two important implications of this: (1) more funding would flow to developers and communities, and (2) as long as investors believe in the longevity of the new demand signal, more funds should flow into incremental projects as new higher-cost projects (such as afforestation) become a more profitable investment.
- **Increased demand.** Described more fully in the "Accessibility" bullet point below, tokenizing carbon credits expands access to at least two new sets of consumers: individuals, and Web3 companies. Additionally, small businesses are at a distinct disadvantage in the current market given the costs and sophistication required to navigate it, and therefore the same blockchain infrastructure that serves individuals can be utilized by small businesses to access carbon credits as well.
- **Royalty payments or additional revenue.** There are opportunities to add additional revenue flowing back to project developers and local communities. Tokens can be programmed so that at the point of initial sale, a percentage of revenue goes back to local communities automatically. Subsequently, there are additional opportunities to siphon a percentage of transaction or other fees that can be automatically diverted to community-controlled wallets or project developers.
- **Enhanced access to early-stage finance.** One significant challenge with today's VCM is the ability to drive financing to early-stage project development. Tokenizing carbon credits can be part of a larger, more holistic opportunity, to make earlier project investment opportunities similarly accessible to accredited investors. As an indication of what may be possible in the future, in September 2022, Flowcarbon partnered with an open, decentralized finance protocol and real-world asset marketplace called Centrifuge, a blockchain platform open only to accredited investors, enabling the syndication of investment opportunities for real-world assets. The partnership enabled a forward sale of carbon credits to be used as collateral for junior and senior tranching debt offerings. The purpose of this initial investment was to demonstrate that blockchain-based institutional investors are interested in providing debt at favorable rates to carbon project developers who are still in the pre-issuance stage of their project. The platform format ensures equal access for small and medium sized projects to capital that exists on-chain, and blockchain-based investors looking for more diversified investment opportunities. If the projects then issue credits as tokens, investors can be repaid seamlessly and automatically, creating an efficient and effective flywheel for earlier project investment.

## Benefits to Corporate & Individual Offset Buyers

- **Accessibility.** Purchasing carbon credits as tokens on a blockchain exchange will mirror in many ways the experience of buying assets on any other web platform: everyone can access the same goods, at the same time, at the same price. Instead of potential buyers having to chase down brokers and negotiate bilateral transactions, token-based commerce is open to all at the same price and time. As such, tokenization not only improves on the current transaction models, but actually opens up access to at least two new sets of demand-side participants who are effectively unable to transact in the current ecosystem, and enhances access to a third currently underserved segment.
  - **Individuals.** Currently, there is no realistic way for individual, conscientious consumers to purchase, hold and retire voluntary carbon credits. They are often precluded from holding registry accounts, leaving them unable to custody credits. They also largely cannot and will not access the web of brokers required to transact in this market, and even if they did, their purchase amounts are almost always too small to be worthwhile for intermediaries to service. The best available solution to this challenge, as articulated in the preamble to this section, is via tokens. Anything available on a public blockchain can be purchased by anyone in the world with an internet connection and a blockchain wallet. There are already tens of millions of individuals and entities that have blockchain wallets; as anyone with experience trying to onboard people to a new product knows, it is faster, more cost effective and more achievable by orders of magnitude to allow users to transact where they already are, rather than trying to onboard them to new platforms where they are not yet active. This also extends to the small and independent business market, addressed further below, which are often closely held by individuals.
  - **Web3.** Tokens also open up access to the universe of blockchain companies, protocols and other entities who can use tokenized carbon credits to offset their historical and ongoing emissions. For example, the Celo Layer 1 blockchain committed to purchasing \$10M USD of tokenized carbon credits when they become available. We know of at least another \$200M USD that has already been pledged to sustainability and carbon initiatives by other protocols like Polygon, Celo, Solana and Hedera, but much of this capital has remained on the sideline because there is currently no easy way to incorporate carbon credits into their ecosystems. Additionally, Flowcarbon has created a multitude of partnerships to date that demonstrate how tokenized carbon credits might be used as “lego blocks” by protocols, including with NFT platforms, EV charging companies, ethical commodities, and travel companies.
  - **SMBs.** Lastly, small to medium sized corporations currently face very high transaction costs and a high degree of uncertainty should they choose to purchase carbon credits. Tokenization, including bundling of similar projects, will dramatically increase the ease by which these customers can access and purchase carbon credits. See the “efficiency” bullet below for further detail.

- **Transparency.** The VCM today is inefficient and opaque. It is difficult to quickly access, analyze and understand relevant project data, and a single type of carbon credit can sell for wildly different prices to different buyers. Utilizing blockchain with tokenized carbon credits can create an open and transparent market with clear price discovery for all.
- **Composability.** Web3 composability means that tokens become user-friendly, open-source “lego blocks” that can be used (in accordance with the rules associated with them) by anyone to innovate and build on top of them. There are countless ways that carbon credits as a “lego block” can be used by innovative builders to galvanize new climate action. Flowcarbon’s partnerships have already demonstrated some of these theoretical use cases:
  - Using them in a sustainable NFT platform to automatically offset NFT drops as they happen
  - Using them as part of a loyalty rewards program for a commerce platform
  - Using them in a crypto wallet to automatically offset a user’s wallet activity
  - Using them as a foundational building block for an “ethical commodities” protocol that will seamlessly facilitate the meeting of institutional net zero commitments
- **Clear, automatic link between credits and project information.** There are discussions in the VCM about “native” tokenization and on-chain issuance of carbon credits. In that potential future state, it would certainly enable validators, certification standards, and buyers to quickly and transparently access key data underlying credit issuance and certification, bringing down costs and increasing speed to market. It will also bring down ongoing monitoring costs for third party verification. But even as a more conservative first step, allowing for the tokenization of already-certified and issued credits allows token buyers to access, within a click or two, all relevant information associated with their token and the project underpinning it. To demonstrate this, Flowcarbon has already announced a partnership with international project developer Allcot to pilot the development of a “blockchain-first” carbon project. This first-of-its-kind program will leverage blockchain technology to aggregate the data required for validation, verification and certification, and after credits are issued on-chain, will demonstrate how tokens can be linked to this data for maximum visibility into the underlying project backing a token.
- **Efficiency.** The market currently is unduly expensive and slow across every step in a carbon credit transaction - issuance, legal contracting, clearing, settlement and custody. Tokenization inherently streamlines all aspects of the purchase process for individuals and corporations, saving them time and money.

#### Benefits to Independent Standards/Registries

- **Maintaining environmental and market integrity.** Gold Standard’s carefully developed methodologies, multi-layer issuance processes, and third-party verification set the standard for environmental integrity in the market for greenhouse gas (“GHG”) reductions. Unlocking Web3 infrastructure for those assets has the potential to greatly increase the market reach and accessibility to rigorous and verified GHG emission reductions. Given the persistent and (rightfully) increasing global attention paid to



preventing and removing GHG emissions from our atmosphere, Gold Standard not permitting tokenization will likely and unfortunately lead to the proliferation of third-party monitoring, reporting, and recording (“MRV”) methods, on- or off-chain, that rely on other standards that are likely less rigorous and will consequently have the counterproductive goal of increasing quality-related uncertainty in the VCM. It is important to note, too, that an increase in access does not have to come at the expense of market safeguards. It is absolutely essential that the integrity of the VCM be maintained, if not improved, through tokenization efforts. To this end, Know-your-customer (“KYC”) checks can and should be conducted at the appropriate points in the on-chain carbon lifecycle.

- **Expanded scale and greater impact in a shorter time frame.** Gold Standard, and other standards/registries, exist to drive real and meaningful climate action. Harnessing the power of tokenization, with appropriate safeguards, can play a significant role to both increase demand and build trust in the VCM, and do so quickly, in the time frame required for this market to achieve its goal of having meaningful climate action.
- **New use cases.** The indirect benefits of blockchain and tokenization may prove to be as powerful in the long run as the direct benefits. For example, increased transparency of the role that voluntary carbon credits play in the emissions reduction claims of corporations will bolster confidence in the VCM. On-chain retirement data could be readily available, allowing anyone to easily confirm that a corporation's claims match their stated efforts at reducing emissions. Tokenization can both directly and indirectly lead to significant enhanced ecosystem-wide benefits

***Do you consider there to be potential advantages or disadvantages for your organisation if this were enabled?***

A core objective of Flowcarbon's business is the tokenization of carbon credits so the enablement of this functionality by Gold Standard would be beneficial to Flowcarbon.

That being said, it is worth underscoring that tokenization, and architected by Flowcarbon, significantly reduces the margin that anyone, including Flowcarbon, can add to a carbon credit. VERs are issued to project developers, who would pay a fixed, blanket fee of 2% of VERs to the tokenizing entity (i.e. Flowcarbon) to receive tokenized representations of their VERs which they could then sell. Therefore, Flowcarbon's upside is transparently capped at 2% on the initial tokenization, which is far less than most margins built into other sales channels and intermediaries in the existing market mechanisms.

Thus, Flowcarbon does not consider the actual tokenization to be a high-potential source of revenue, but rather views it as a transparent and efficient foundational architecture upon which to expand and scale the VCM through new project development, informational tools, and other market functions that can be built atop an efficiently functioning spot market.

***Would you like to share any additional comments not covered by questions included in this consultation?***

Flowcarbon believes that the benefits of tokenization discussed above can only be fully realized if the carbon credits are brought onto a public blockchain. Private blockchains, those that are completely permissioned and confined to a limited number of actors, are good at providing proof of provenance and transaction history to those within the ecosystem, but they lack many of the important benefits discussed above including access, transparency, and composability.

***Do you consider there to be uses of blockchain technology that should be distinguished and treated differently from others?***

Flowcarbon believes that Gold Standard has appropriately included requirements as part of this Consultation relating to the emissions footprint of blockchain technologies. Other than that, we do not believe there are other applications of blockchain technology that should be distinguished and treated differently from others.

## Model

***Do you consider the custodial account model to be workable in the short-term while other solutions are explored?***

Allowing tokenization to proceed via third parties is the optimal way for the VCM to explore how a tokenized market functions. Giving the opportunity to a number of tokenizing entities—who will have had to be vetted and approved as account holders by Gold Standard, and therefore will have agreed to a clear set of guidelines and requirements—is the correct way for the market to effectively “sandbox” tokenization. It will allow the VCM writ large, and the standards in particular, to see how tokens are used, adopted and transacted while shifting the vast majority of the legal, financial, technological, time, and other investment burdens onto tokenizing entities.

Flowcarbon, together with our legal advisors, believes that this structure works very well and that the legal construct of bailment can be applied to enable tokenization with the right legal protections and allocation of responsibilities. In a contractual bailment structure, a third party special purpose vehicle (“SPV”) receives VERs that are generated by Flowcarbon’s Supply Partners. The Supply Partners would then in turn receive GCO2 tokens that act like “warehouse receipts” for the VERs held in the SPV’s Gold Standard registry account. The Supply Partner would receive GCO2 tokens on a one-to-one basis, whereby one GCO2 token held by a Supply Partner represents one VER held by the SPV. Using this approach means that all GCO2 tokens issued by Flowcarbon to its Supply Partners correspond to VERs held in a single Gold Standard

registry account. This bailment structure is commonly used in a range of contexts unrelated to crypto or blockchain such as agricultural commodities and represents an established framework for facilitating tokenization. This structure also creates a legally enforceable framework surrounding tokens and the underlying assets, such that a tokenization partner like Flowcarbon can process token holders' redemption and retirement claims.

Moreover, as discussed above, aggregating all of the VERs generated from all of the Supply Partners in a single Gold Standard registry account will facilitate an easy auditing process. This approach means the auditor has only one account to check—in effect a single source of truth—to determine the tokenization and retirement history. This account information can quickly be compared to the on-chain events of the tokenization protocol to confirm that the two match. We encourage Gold Standard to set an appropriate cadence for audits to verify this.

In addition, there are numerous tools and solutions that can be used or built by tokenization partners to ensure complete and easy access to information for buyers about the VERs being purchased, even beyond what exists in the market today. For example, should Gold Standard enable a third party to scrape the VER holding information from accounts that are white-listed to tokenize, “disclosure dashboards”, or a similar type of transparency mechanism, could display all of the credits currently held in the relevant account as well as the types and counts of carbon tokens that have been issued. At best, the dashboard would connect to Gold Standard via a third party oracle service, (such as Chainlink), to ensure that the tokenization partner is not misrepresenting the numbers or availability of credits for purchase. The registries could require that these dashboards be updated frequently. This would provide an extra layer of fraud prevention, as any potential buyer of the carbon tokens would be able to easily check that the specific credits exist in the relevant account. In addition, to the extent there are concerns about the double selling of the same credits in both tokenized and non-tokenized form, potentially required information disclosure could ensure that any buyer of the underlying carbon credits would be able to see that those carbon credits have already been tokenized. Third parties that tokenize carbon credits that also want to sell underlying carbon credits could be required to communicate to the buyer the existence of this website / transparency mechanism.

Over time, the manual auditing which ensures that relevant account holders are doing what they should can be phased out by APIs. APIs can be created by the standards which would automate retirements and inventory checks. Flowcarbon is ready to partner with Gold Standard's technology support provider to help create these APIs.

***Do you consider it appropriate for Gold Standard to explore ‘native tokenisation’ in the future?***

Yes, Flowcarbon believes it makes sense to begin tokenization with third parties, while “native tokenisation” is explored as a potential long-term solution. There are two main reasons for this:

1. **It ensures that tokenization of carbon credits is done in a credible manner.** There is much momentum and potential at the intersection of blockchain technology and carbon markets. We believe it is important for a leader such as Gold Standard to set up, in a timely fashion, a credible and thoughtful framework for high-integrity tokenization. In the absence of a leading ICROA-recognized standard such as Gold Standard leading the charge, there may be other less credible standards and actors that enable tokenization in a manner that would not be optimal for our collective goal of scaling a high-integrity market.
2. **It mitigates risk to Gold Standard.** There is not yet comprehensive legislation or specific regulatory guidance with respect to digital assets that would, with certainty, apply to tokenized carbon credits. While Flowcarbon believes the risk is low for thoughtfully structured protocols, it is prudent for Gold Standard to transfer any potential risks to credible third-parties in order to stimulate innovation and drive the market forward. This buys Gold Standard time to (a) continue to learn about tokenization and how it is taking shape in the market and (b) prepare to implement a thoughtful and comprehensive native approach to tokenization if it chooses to do so.

***Would you like to share any additional comments on this topic?***

No.

## Holding, Retirement and Reporting

***Do you consider these proposals to be workable and proportionate?***

We agree with all the proposals listed in this section. Each of these is critical to maintain market integrity and efficiency.

Blockchain is intended to prevent double use, but the on to off-chain retirement process must be secure. Flowcarbon's retirement process is included in the appendix. This process was developed by leading carbon lawyers and blockchain developers and ensures that all credits are retired in a timely manner.

The ability to redeem a tokenized VER is a critical function for any system or protocol of tokenization. This function helps to create an efficient market by allowing protocol users to take VERs back off chain. This reactivation, or "redemption" as we call it at Flowcarbon, is necessary to ensure that the off-chain and on-chain carbon markets remain connected. It prevents the



price swings sometimes seen in crypto markets by creating a mechanism for arbitrage that would naturally drive any price difference between the on- and off-chain markets to zero.

How can “redemption” facilitate price stability? If the price of on-chain carbon tokens suddenly was to spike above the off-chain price of the underlying VERs that underpin those tokens, we would expect to see more VERs brought on-chain, increasing the supply of tokenized carbon credits and driving down the on-chain price. The same would be true in the reverse situation in which the price of tokenized carbon credits falls below that of the off-chain underlying VER. On-chain credits would be quickly bought up, redeemed, and then sold off-chain for the higher price. An exclusion of this ability could leave the market unable to reign in excessive speculation<sup>4</sup>. In Flowcarbon’s tokenization protocol, this process is simple and straightforward.

Lastly, the information on the carbon project behind the token must be available at one click to the token holder or prospective purchasers. Via Flowcarbon’s interface, a holder can see all the relevant project information associated with the tokenized VER. The image below is an example taken from Flowcarbon’s project information page.

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<sup>4</sup> Flowcarbon has previously written on the benefits of a “two-way bridge”. If Gold Standard is interested in learning more, please visit: <https://www.flowcarbon.com/knowcarbon/why-a-two-way-carbon-credit-bridge-is-necessary-for-investors>

**Zambia**

## Luangwa Community Forests Project

Registry ⓘ Additional Certification ⓘ Project Type ⓘ

**Verra**   **CCB Validation Approved**   **Agriculture Forestry and Other Land Use**

### About this project

The Luangwa Community Forests Project is a large-scale REDD+ project implemented in Eastern and Lusaka Province, Zambia, with an initial project area of 943,676 ha. A second project instance was added in 2021, comprising 92,990 ha, bringing the total project area to 1,036,666 ha.

The project is being implemented on communal land in 12 chiefdoms falling within Game Management Areas (GMA) and two private ranches. Implementation is in partnership with the traditional authorities and the government of the Republic of Zambia.

The project will generate emissions reductions through avoided deforestation, using the following mitigation activities: A combination of direct conservation support (forest monitoring and encroachment prevention) engagement and capacity building with key Government and community stakeholders, and conservation incentives for the area protected, including performance-based payments delivered to empowered community stakeholders through local institutions, and support to deforestation mitigation activities, including sustainable, improved livelihoods activities.

Date: **2019-10-30**  
Area: **1,036,666 hectares**  
Est. Annual Emission Reductions: **2,985,650 in tonnes**

### Co-Benefits & SDG ⓘ

- Conservation of biodiversity in the Lusaka province
- Support of social development for communities living in the area

4 QUALITY EDUCATION

3 GOOD HEALTH AND WELL-BEING

2 ZERO HUNGER

1 NO POVERTY

5 GENDER EQUALITY

6 CLEAN WATER AND SANITATION

7 AFFORDABLE AND CLEAN ENERGY

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10 REDUCED INEQUALITIES

11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

14 LIFE BELOW WATER

15 LIFE ON LAND

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

17 PARTNERSHIPS FOR THE GOALS

### Project Developers

Developer Name: **Multiple Proponents**  
Project ID Code: **VERRA-VCS-1775**  
Registry Link: <https://registry.verra.org/app/projectDetail/VCS/1775>

Flowcarbon project information page

***What do you consider to be an appropriate timeframe in which retirements must be made on the Gold Standard Registry, following their retirement on a third-party platform?***

We recommended a T+2 settlement timeline for registry retirements after a retirement event has happened on-chain. This settlement timeline is common across financial markets. It ensures a limited time to final retirement in the registry while also allowing operators sufficient time to perform retirement activities.

It is important to note that any token that is “retired” on-chain is immediately “burned” or destroyed. Therefore, in the absence of an API automatically linking token retirements to the underlying VERs, it may be possible for a credit’s state to be listed as “active” in the registry during the T+2 period, after its tokenized representation has been retired, but it is not possible for someone to take custody of or retire that token again.

***We are aware that some organisations may wish to create and market tokens that represent fractional portions of one carbon credit. Do you have experience or ideas for how requirements may need to vary in such cases, for instance related to retirement in the Gold Standard Impact Registry?***

The introduction of fractionalization functionality for on-chain carbon credits does not necessitate additional requirements or a change in operations for the Impact Registry. All interactions between the tokenization partner and the Impact Registry would happen in whole numbers.

There are three actions that would connect the Impact Registry to the on-chain environment: tokenization, redemption, and retirement.

- **Tokenization:** Fractionalization has no impact on tokenization, as carbon credits are coming on to the blockchain directly from the Impact Registry, which currently does not issue fractional VERs. If someone has 100 VERs and requests to tokenize them, she will receive 100 tokens in return.
- **Redemption:** The implications of fractionalization on redemption are also relatively straightforward. In Flowcarbon’s architecture, all redemption requests must be made in whole numbers. So if someone owns 100.5 tokens, she could only request to redeem 100 of them, and would receive 100 VERs. The extra .5 token would remain in her crypto wallet, where she could either hold it or sell it.
- **Retirement:** Fractional retirements can also be handled easily through Flowcarbon’s retirement accumulation approach. As discussed in the retirement process portion of the Appendix, off-chain retirement in the Impact Registry of tokens that have been retired on-chain happens once daily. Between the previous off-chain retirement event and the next off-chain retirement event, a balance of retired tokens builds up in the token smart contract.

For example, say that off-chain retirement happens every day at noon. A user retires 400 tokens at 2pm, and then 100 tokens at 10am the next day. When noon comes, the operations team that performs the retirement sees that there is a balance of 500 waiting to be retired and goes into the Impact Registry and retires the appropriate 500 VERs. If we introduce fractionalization, this process remains the same, but a daily rollover balance is introduced. Consider an example where a user retires 400.5 tokens at 2pm and then 100.75 tokens at 10am the next day. At noon, the operations team sees there is a balance of 501.25 waiting to be retired. The team retires 501 VERs, and the .25 remaining is carried over to the next day.

Fractionalization is a critically important feature to enable tokenization and blockchain technology to help scale the VCM. Fractionalization helps improve liquidity by allowing for smaller transactions. Fractionalization also supports the development of new use cases. For example, an NFT marketplace, a decentralized exchange or any Web3 protocol with regular transactions can automatically calculate and offset the emissions from every transaction. The emissions per transaction would be relatively small when operating on a proof-of-stake blockchain, so the accompanying offset would need to be in a denomination below one ton.

***Would you like to share any additional comments on this topic?***

No.

## Pooling

***Do you think that Gold Standard should consider restrictions on the ability of organisations to pool its issued credits with credits from other standards. Why?***

Flowcarbon appreciates Gold Standard's desire to protect the quality and reputation of its credits, and Gold Standard's open-mindedness in requesting feedback on what the optimal approach is.

As a matter of principle, Flowcarbon believes that one of the main benefits of tokenization—the ability to introduce more fungibility in the VCM, to enhance liquidity and market efficiency—could be significantly stymied if rigid restrictions are placed on pooling, or “bundling” as Flowcarbon calls it. Putting restrictions in place that hinder forward progress should be done so cautiously, as Gold Standard is wisely demonstrating.

The most important point to note is that in a tokenized market, pricing is completely transparent, and therefore Project Developers and other carbon credit owners are well positioned to make decisions about whether to place credits in bundles to optimize their financial return. In a market with the benefits of price transparency - which will be significantly aided by enabling the



on-chain market to function - there is limited need to protect carbon credit owners from making suboptimal decisions.

To illustrate how the market would effectively enable price transparency, let's consider a hypothetical situation whereby Flowcarbon facilitates a bundle which accepts "any credit certified by a list of 10 standards from an Energy Efficiency / Renewable Energy project, issuance years 2015-2020". This hypothetical "Bundle 1" can theoretically accept a range of assets, which may include credits from both Verra and Gold Standard, across a range of issuance years and co-benefits.

However, Flowcarbon's two-way bridge enables sophisticated market participants to instantly recognize mispriced assets from a bundle and "redeem" them, to then sell for the correct market price off-chain or in another more appropriate bundle. For this, two key features of Flowcarbon's tokenization architecture are essential: the ability to "redeem" (or detokenize back into "regular" nontoken VERs) and the ability to transparently see at all times which underlying assets are in the bundle

Over time, as increasing volume moves on chain, bundles can become more and more specific while still maintaining significant liquidity. What will quickly occur in each bundle is that the bundle will typically comprise the lowest-priced qualifying assets, and if there is demand being unmet for higher priced assets, a new bundle is deployed. Should a market participant be able to secure a higher price for Gold Standard credit than a credit from another standard, or for one Gold Standard relative to another, these bundles would be bifurcated. Market forces, enabled by flexibility and a two-way bridge, will quickly and efficiently lead to full price transparency for all.

As such, we would recommend against placing specific restrictions on the ability of organizations to pool its Gold Standard credits with credits from other standards.

***If the answer to the above question is yes, do you have views on how any restrictions could operate?***

If Gold Standard were to decide to place restrictions, we recommend these restrictions be as flexible as possible, and also done at the standard level. For example, it would be more advantageous to the growth of the market for the restriction to be that Gold Standard credits can only be pooled with credits issued by ICROA-certified organizations rather than Gold Standard credits can only be bundled with other Gold Standard credits.

***Would you like to share any additional comments on this topic?***

No.

# Due Diligence

***Is it sufficient for organisations intending to create original on-chain representations of Gold Standard credits to undergo our existing KYC checks, or should further due diligence requirements be introduced? If so, for whom?***

From a practical perspective, the carbon tokens carry virtually the same money laundering/terrorist financing risks as the underlying VERs, with neither being good vehicles for financial crime according to multiple experts in digital assets and financial crime consulted by Flowcarbon.

Accordingly, we recommend that Gold Standard subject any potential tokenization partner to the same level of KYC that it applies to its other counterparties. Gold Standard should ensure that platforms with which it deals: (i) are legitimate companies licensed to do business in the relevant jurisdiction; (ii) have reviewed and understand Gold Standard's terms of use; and (iii) possess the capabilities and experience to manage a program like the one contemplated herein (e.g., issuing carbon tokens, maintaining books and records with respect to the carbon tokens, "burning" carbon tokens).

***Do you think that Gold Standard should introduce requirements related to the due diligence checks that organisations creating digital tokens representing Gold Standard credits apply for their own users?***

The tokenization platforms should be required to conduct KYC checks (reflecting, at a minimum, the KYC checks Gold Standard conducts on any entities that have accounts with Gold Standard (e.g., Supply Partners and beneficiaries of VERs) on each Supply Partner and any party that is redeeming the carbon token (i.e., "de-tokenizing" the token and receiving the underlying VER to use off-chain or re-tokenize it). Conducting KYC at the "on-ramps" and "off-ramps" of the token protocol is an effective method to prevent money laundering and terrorist financing because it makes it extremely difficult for a bad actor to place unlawful proceeds in, and extract laundered money from, legitimate fund flows.

Neither Gold Standard nor the platforms should be required to conduct KYC on persons who hold the carbon tokens between the initial Supply Partner who receives the newly-minted token, and the ultimate claimant. These potential "intermediary" token holders may have been subject to KYC by third-party exchanges through which they purchased the carbon token, but the tokenization platforms have neither the legal obligation nor practical opportunity to conduct KYC on successive holders given that the platforms would not ordinarily interact with holders other than at the on/off-ramps of the token protocol.

With regards to individuals or entities that, when retiring a VER, desire their claim details to appear in the Impact Registry, Flowcarbon's understanding is that there is no legal requirement for either Gold Standard or the platform to conduct KYC. In fact, we have been advised that the

SEC will require that registrants obtain third-party audits regarding the veracity and accuracy of their emissions reporting and, with respect to voluntary reporting, the prevailing market practice is for companies to seek verification or assurance before using a sustainability report that is “compliant” with reporting frameworks such the GHG Protocol or SBTi. Neither the Registry nor the Tokenization Platform is an emissions auditor; other entities play that role. Nevertheless, if Gold Standard does require KYC for certain entities retiring carbon credits, Flowcarbon can and will meet that obligation.

We would also note several other factors that provides Flowcarbon with comfort that tokenized representations of carbon credits are not likely to lead to a material risk of money laundering:

- The requirement to conduct KYC at on- and off-ramps inherently makes carbon credits a less advantageous pathway to conduct illicit activity as compared to a wide variety of other crypto assets which do not all have KYC requirements (note the current market cap for all Cryptocurrency is ~\$1 trillion<sup>5</sup> compared to the \$2 billion carbon credit market).
- Celo—where Flowcarbon envisions first launching its tokens—is, like many of the most commonly-used Layer 1 blockchains, a public blockchain, so every transaction can be traced; a bad actor looking to launder money is more likely to use a privacy-preserving chain like Monero or Z-cash.
- Although it may be technically possible, it is highly unlikely that a corporation or individual would choose to launder dirty money by retiring carbon credits.

***Are there examples from other sectors that you believe could be learned from?***

The most apt example in the crypto sector would be the stablecoin USDC. New USDC is created when a user creates an account with Circle (the operator of USDC) and deposits dollars. The account creation process, i.e. the onboarding of US dollars to the blockchain, is done pursuant to KYC on the new account holder. Once the user receives USDC, she is able to trade that USDC to third parties without that third party having to undergo Circle’s KYC process. If a user wants to exchange the USDC for a US dollar, i.e. “redeem,” they must set up an account and undergo Circle’s KYC process, and then request redemption. In this way, the on- and off-ramps are subject to KYC but the activity that happens in between is allowed to take place without KYC checks.

***Would you like to share any additional comments on this topic?***

No.

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<sup>5</sup> <https://coinmarketcap.com/charts/>

# Sustainability

***Do you agree that Gold Standard should apply restrictions related to the emissions footprint of blockchain technologies?***

Yes, we agree that tokenized representations of VERs should be limited to energy efficient blockchains. It is critical that carbon reduction embodied by the VER is not diminished through tokenization.

***Do you consider these proposals to be workable and, if not, why?***

Yes we consider these proposals workable.

***Do you consider these proposals to be sufficient and, if not, why?***

Yes we consider these proposals to be sufficient. Additional requirements may create an undue burden and limit innovation in the sector.

***Are you aware of, or would you recommend, a benchmark that Gold Standard could use to determine whether blockchain technologies have a sufficiently low emissions footprint for consent to be granted?***

We recommend that Gold Standard limit tokenization to only blockchains that use a proof-of-stake consensus mechanism. Blockchains utilizing proof-of-stake mechanisms use 99.95% less energy than proof-of-work mechanisms, and each incremental transaction does not result in additional energy usage.

# Data Security

***Do you agree that Gold Standard should either introduce conditions or require information related to the IT security measures that an organisation is taking to protect data against breaches?***

One benefit of third party tokenization (as opposed to native tokenization) is that Gold Standard is legally insulated from any data or security breaches that may result from on-chain activities. Nevertheless, Flowcarbon does believe it is important for Gold Standard to take reasonable

precautions to mitigate the risk of on-chain data breaches from occurring, as they may result in reputational harm.

***If so, do you have views or recommendations on what Gold Standard should require?***

First, Flowcarbon recommends that all smart contracts released on the blockchain related to the tokenization or bundling of VERs undergo security audits by reputable third parties that have an established track record of operating in this field. These audits provide a level of scrutiny that there are no hack vulnerabilities in the smart contract code that could be exploited.

Second, there should be a clearly documented, secure process for token issuance, including a requirement for multi-signature authorization.

***What are the primary risks that you believe Gold Standard should consider when writing its requirements on this topic?***

As discussed above, a third-party tokenization scheme greatly reduces, or completely eliminates, Gold Standard's IT and data security risk. However, the buyers of the tokenized VERs are exposed to some risk. The two primary risks are:

1. That tokens are stolen; or
2. That tokens are minted without an underlying VER backing them

On the second risk, the previously mentioned recommended security requirements will effectively mitigate the risk of tokens being minted without an underlying VER, as well as hacks of the tokenization protocol itself. The suggested auditing process will doubly ensure that what resides in the white-listed token account matches the tokens in circulation.

On the first risk: it is important to note that the power of blockchain, including facilitating greater access, composability and decentralized finance, does come with a non-zero risk of hacks. These risks exist on all blockchains and cannot be completely eliminated, but the blockchain community has made tremendous progress in recent years through enhanced standardization, security, and best practice in the area of smart contract research that has dramatically improved the ability to mitigate risk.

In addition, from a Gold Standard perspective, the risk here is largely centered on an individual's potential to lose some amount of capital, rather than issues relating to the retirement and redemption of Gold Standard VERs. Implementing blockchain-appropriate security measures similar to those discussed above will dramatically reduce the likelihood of any breaches causing material harm to any stakeholder, especially those directly producing or retiring credits. And where tokenization happens through a third party, Gold Standard is removed from hacking related responsibility.

***Are there benchmarks, good practice codes or similar reference points for IT security requirements that you would recommend Gold Standard following or taking into account?***

Additional cybersecurity practices such as two factor authentication and e-learning for employees on phishing and scamming should also be considered. Existing industry best practices (e.g. [AWS Data Protection](#)) should be followed and partners must comply with any and all data security and privacy laws in its jurisdiction.

## Permitted Units

***Do you agree with the proposal not to initially permit the tokenisation of these categories of credit, until tailored safeguards are developed?***

Yes. We agree with Gold Standard that tokenization of PERs would be highly valuable and encourage this as soon as it is reasonably practical. However, to start, we believe it is prudent to focus on tokenizing VERs.

***Do you believe there are other types of carbon credits that Gold Standard should consider creating tailored safeguards for? If so, why?***

No.

***Would you like to share any additional comments on this topic?***

No.

## Reputational Harm

***Do you consider Gold Standard's existing conditions related to reputational harm to be suitable for the act of creating digital tokens representing Gold Standard credits?***

In general, we believe that Gold Standard's existing conditions related to reputational harm provide sufficient protection for Gold Standard in relation to the creation of digital tokens, as, on

its face, it gives Gold Standard limitless leeway to take any measures it deems fit. For that reason, Flowcarbon suggests that the following provision in S. 17.1(b) of the Registry App Terms of Use, copied below, is in fact unduly broad and might discourage responsible companies from building anything leveraging Gold Standard assets insofar as they would not understand what may trigger Gold Standard's rights under this section, nor what consequences there might be:

*The Gold Standard or SC may take any action at anytime in its sole discretion to protect its reputation and goodwill*

Coupling a subjective determination made in Gold Standard's sole discretion with an absolute right to take any action should cause any credible business (not specific to blockchain) to think twice about building infrastructure on top of Gold Standard's registry. As such, we encourage you to consider incorporating a reasonable notice and cure period.

***If not, what amendments or additions do you believe are needed?***

None.

***Would you like to share any additional comments on this topic?***

No.

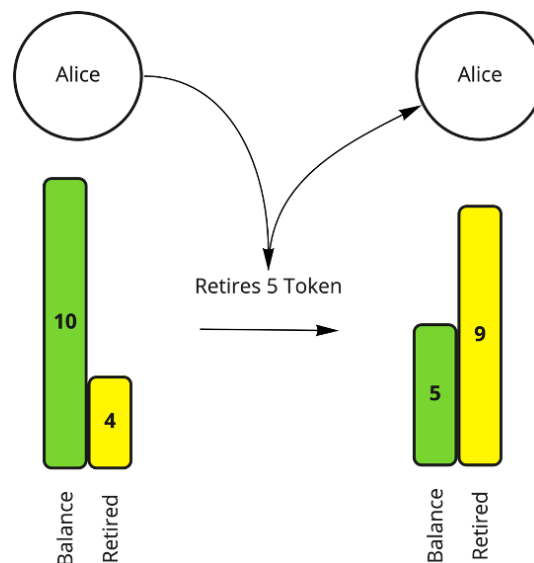
# Appendix

## Retirement Process

The Flowcarbon protocol keeps track of two values per user:

1. The “token balance” is the number of live carbon credit tokens a user has
2. The “retirement balance” is the number of carbon credit tokens that a user has retired

When a user retires a token, her token balance decreases by the amount specified and her retirement balance increases. Tokens that are retired by the user in this interface are immediately destroyed, or “burned”. Burning removes the token from existence permanently so that it cannot be sold or retired again. The retirement balance is strictly a number identifier and cannot be transferred.



*If Alice is retiring 5 tokens, then her balance decreases and her retirement increases.*

The on-chain retirement then triggers a process to retire the underlying VERs in the registry.

GCO2s and bundle tokens can be retired on-chain via the Token User Web Interface, an online interface available on Flowcarbon’s website, allowing the holder of the token to claim the environmental benefit.

For a GCO2 retirement, the process is straightforward. The user connects her crypto wallet to the website and then selects the token she would like to retire and the amount of tons (number of tokens) to retire.



What you can do

Buy tokens

Offset carbon

Swap bundle

### Offset carbon emissions

You can reduce your CO2 footprint and offset your carbon emissions by retiring the carbon tokens, that you have purchased. Retiring 1 carbon token, offsets 1 metric ton of CO2.

How many tonnes of CO2 do you want to offset?

0.5

mt CO2

Don't know how much to offset? [calculate footprint](#)

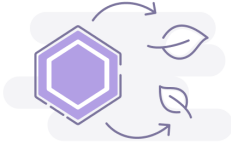
Which token do you want to use? ( 1 token = 1 mt CO2)

Albany Water Board (ACR424-20)

▼

You have 12 tokens in your wallet

Offset now



#### *Retirement of GCO2s*

The process is slightly different for bundle tokens. The user has the option to retire the bundle token, in which case an automated process occurs in which the GCO2 with the oldest vintage then present in the bundle is automatically retired; or, if she wants to choose the specific project from which the credit will be retired, she can select a specific GCO2 present in the bundle from a drop down, and that will be retired for her. It is important to note that in both of these scenarios, the bundle token and the GCO2 held within the bundle are immediately burned to prevent any double use. The only difference is whether the user takes the extra step of selecting a specific project in the bundle from which her retirement will happen.

## Offset carbon emissions

You can reduce your CO2 footprint and offset your carbon emissions by retiring the carbon tokens, that you have purchased. Retiring 1 carbon token, offsets 1 metric ton of CO2.

How many tonnes of CO2 do you want to offset?

5

t CO2

Don't know how much to offset? [calculate footprint](#)

Which token do you want to use? ( 1 token = 1 mt CO2)

Land Use & Forestry (LUF)



You have 12 tokens in your wallet

Do you want to offset a specific token from this bundle?

- ☐ No, offset any token from this bundle
- ☒ Yes, offset specific project token

Bluesource - Burnt Mountain (ACR518-21)



*Retirement of Bundle Token*