



**The HBAR Foundation Sustainable Impact Fund
Comments^{1,2} on Gold Standard's September/October 2022 Consultation on Tokenization**

*Submitted via email on October 28, 2022
to hugh.salway@goldstandard.org*

1. INTRODUCTION

The HBAR Foundation (THF), through its Sustainable Impact Fund (SIF), welcomes this opportunity to provide comments on the Gold Standard (GS) open consultation: “Conditions for Consenting to Tokenization of Gold Standard-Issued Credits.”

The Foundation. THF is a quartet of Web3 accelerator funds launched at the end of 2021 to support growth and adoption of Hedera Hashgraph, a sustainable proof-of-stake public distributed ledger network differentiated by ultra low energy requirements and carbon negativity, high speed and throughput, highest-grade security (e.g., ABFT), and low fees.

The Fund. The SIF is the Foundation's climate-action focused US\$100M fund dedicated to accelerating development and deployment of innovative sustainability and ESG solutions build on and enabled by distributed ledger technology (DLT) – with particular emphasis on transformative climate finance, carbon accounting, emissions management, ESG reporting, and environmental project integrity solutions, enabled by Hedera.

Our Mission. Our mission is to bring the balance sheet of the planet to the public ledger. We are a team of subject-matter experts in sustainability and ESG with deep backgrounds in DLT committed to leveraging emerging technologies to solve real-world environmental problems. Using targeted investments in DLT-enabled climate tech, sustainable finance, and ESG disclosure innovators – which we pair with close technical, business strategy, and policy and government affairs support, as well as thought leadership, education, and advocacy – the SIF is helping the DLT industry play a vital role in avoiding the worst impacts of climate change, and ultimately regenerating and sustaining our planet.

As discussed below, tokenizing ecological impacts, including carbon, will simultaneously create vast new markets for climate finance across the globe. DLT enables accelerated and distributed composability and utility for a wide array of climate-positive initiatives, products, and companies. These innovations can address a host of problems in the voluntary carbon markets (VCMs), which have slowed adoption, limited their growth, and reduced public trust in their environmental integrity. By solving for such blockers, our grantees are helping to redirect capital flows to sustainable development and climate mitigation, shifting global habits away from extraction and consumption toward circularity, and driving participation in green initiatives.

This is underway and already paying dividends. The SIF funded Guardian, for example, is the world's first DLT-endable, fully open source digital “Monitoring, Reporting, and Verification” (dMRV) policy workflow engine. Today, companies are using the Guardian to develop and deploy lean, cost-effective

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² These comments are not intended as and do not constitute legal advice.

dMRV solutions in a wide range of pivotal circumstances that previously required months or years and millions of dollars to implement, which include Gold Standard projects. As part of our open source efforts the SIF and Hedera ecosystem will be contributing the open source policies to the Gold Standard dMRV working group, as well as (via Hedera Hashgraph) share our learnings through the Gold Standard Digital Assets for Climate Impact Working Group.

Our Request. Therefore, our respectful suggestion to GS is as follows: please take care not to inadvertently chill expansion of or participation in this dynamic new market at the intersection of climate and crypto. As human-induced climate disruption accelerates, the world cannot afford to lose the innovation that the DLT community can bring. But there is also much to gain. If GS embraces and takes steps to fully catalyze DLT's potential to enable and enhance transparency, auditability, and discoverability of environmental data, climate-positive action could be incentivized across numerous legacy industries.

2. RESPONSES

(2) CATEGORIES

Gold Standard is considering applying conditions in the following areas:

MODEL

The model used to create and manage digital tokens representing Gold Standard credits

HOLDING AND RETIREMENT

Requirements related to the information associated with digital tokens representing Gold Standard credits, the retirement of credits on the registry and reporting by the organization responsible for creation of digital tokens

POOLING

Limitations on the credits that Gold Standard credits can be pooled with

DUE DILIGENCE

Informational requirements as part of Know Your Customer and Anti-Money Laundering checks

SUSTAINABILITY

Requirements to ensure digital tokens representing Gold Standard credits are only created using blockchain technologies with a low carbon intensity

DATA SECURITY

Requirements to ensure organizations take appropriate steps to protect against IT breaches that put digital tokens representing Gold Standard credits at risk

PERMITTED UNITS

Initial, limited restrictions on the type of credits that may be tokenized

REPUTATIONAL HARM

Provisions to protect Gold Standard and its projects from reputational harm

Further information on each of these is provided below, with questions for stakeholders.

In practice, Gold Standard envisages applying these conditions at two points. Some would be part of upfront checks prior to an organization being granted consent to create digital tokens representing Gold Standard credits. Others would be integrated into Gold Standard's Registry App Terms of Use, which organizations

seeking consent would be required to sign. Gold Standard expects that it would need to charge a reasonable fee to organizations seeking consent, to cover costs associated with the assessment process.

Gold Standard then envisages keeping under review whether organizations continue to abide by its requirements, with the right to withdraw or amend consent in instances where its requirements were deemed to be breached.

In addition to the questions included on the following pages, which are specific to each of these categories, Gold Standard invites general feedback from stakeholders in response to the following questions:

- **QUESTION:** Do you agree that Gold Standard should explore and enable organizations to create digital tokens representing Gold Standard credits, using blockchain technology? Why?
 - **ANSWER:** THF advises GS to use the broader term “distributed ledger technology” or “DLT” rather than “blockchain,” which is actually a subset of the larger suite of technologies and tools here under review. Many DLT networks are blockchains, but not all – Hedera and IOTA, for instance. Some of these alternatives may have advantages as tools to scale carbon markets, in partnership with GS.

With respect to “creating digital tokens representing Gold Standard credits,” THF strongly agrees that GS should take all reasonable and necessary steps to ensure that DLT organizations are permitted, encouraged, and empowered to tokenize GS credits. The potential benefits of innovation here are numerous. Public ledgers are the gateway to achieving the SIF’s five strategic goals:

- Making Climate Finance Auditable
- Digitizing & Open Source Methodologies
- Scaling Validation & Verification
- Discovering a Global Carbon Price
- Make ESG Reporting Credible

These goals reflect the SIF’s core values: auditability, data discoverability, and liquidity, in that order. Web3 exposes the carbon markets to new innovations as well as an ethos of open source development with radical transparency. Meaningful discussions can be had on rapid methodology improvements because dMRV’s are not only digitized, but living data producing workflow engines that can enable complex, empirically driven analytical improvement with a clear relationship to data breadth and depth that can be expressed in market prices compared to traditional carbon credits. Higher order attributes can be derived including equitable financing in credits by seeing forward and future financing on credit creation expressed on ledger with financial auditability to participants involved. Attributes with clear rulesets and validation logic with an auditable link are possible and this infrastructure is being used and built upon to enable rapid innovations in quality. These attributes are currently extremely hard to audit, discover, and act on from a price expression in the current state of the market, where pricing information is often bought as a high value data set that companies monetize. The very behavior of companies disclosing their purchase price would be completely auditable if made available for assets tokenized, purchased, and retired on a public ledger.

By tokenizing carbon credits and integrating dMRV systems using open-source methodologies on environmentally sustainable public ledgers, we can lower the risks of opaque data, misaligned incentives, double counting, and fraud. Coupled with emerging digital infrastructure tools such as nested accounting, spatial registries, interoperable

APIs, remote sensor, drone, LIDAR, and satellite data flows, AI (for error correction and fraud detection), and DIDs and VCs (to establish identities and provenance across jurisdictions and governance levels), it becomes feasible to automate otherwise prohibitively burdensome compliance assurance. And because the evidence of compliance is recorded immutably on chain, public trust in the newly automated processes will rise.

- **QUESTION:** Do you consider there to be potential advantages or disadvantages for your organization if this were enabled?
 - ANSWER: THF provides funding to DLT-focused sustainability companies seeking innovative solutions for climate change, but we do not take equity stakes at this time. Our advantage lies in the power of tokenization with auditable links to robust dMRV technology to help “bring the balance sheet of the planet to the public ledger.” We see enabling this capability as a critical step towards aligning our community with the Paris Agreement’s 1.5 degree target—not a benefit to us, but a necessity for our climate transition.
- **QUESTION:** Would you like to share any additional comments not covered by questions included in this consultation?
 - ANSWER: THF offers no response to this item.
- **QUESTION:** Do you consider there to be uses of blockchain technology that should be distinguished and treated differently from others?
 - ANSWER: THF offers no specific guidance here, except to urge GS to approach the question of how to integrate DLT and DLT-enabled digital tools from a pro-innovation, cost-benefit analysis (CBA) perspective. New technologies and new applications of existing technologies each present their own unique constellation of risks and potential benefits, often difficult to quantify ex ante. An over-cautious treatment has the power to shut down innovation for years, which in this case hurts more than DLT platforms but the VCMs themselves. GS should analyze the risks and cost-benefit profiles of novel uses of DLT individually, using reliable and reproducible data.

(2.1) MODEL

The model is the approach adopted to create digital representations of Gold Standard credits, and to manage their connection to the original credits on the Gold Standard Impact Registry. Several early efforts to tokenize carbon credits involved the retirement of credits within the registry of a crediting programme, prior to the creation of a digital representation. This model will not be permitted by Gold Standard as it is inconsistent with the understanding that retirement represents a permanent removal of credits from circulation. Gold Standard invites views on the approach it proposes to take instead.

Initially, Gold Standard proposes to require any organization intending to create digital representations of Gold Standard credits on a blockchain to establish a 'custodial' registry account within the Gold Standard Impact Registry. The custodial account is a model currently used by organizations listing credits on a third-party exchange, in which an account holder manages – or takes ‘custody’ of - credits that are owned by other organizations or individuals, for the period that they are listed on the third-party platform.

In the case of tokenization, the organization intending to create digital tokens representing Gold Standard credits on a third-party platform would be required to establish a custodial account, in which the original credits would be housed for the duration that they are represented as a digital token. Any VERs that the organization or the organization’s participants wished to ‘tokenize’ would need to be transferred into the

custodial registry account prior to their tokenization and held (unretired) in that account for the full period that the VERs are represented as digital tokens on the organization's separate platform. By establishing this registry account, the organization would also be required to sign and thereby take responsibility for compliance with Gold Standard's General Terms and Conditions and Registry Terms of Consultation – Conditions for Consenting to Tokenization of Gold Standard-Issued Credits Climate Security and Sustainable Development Use. Gold Standard considers the model described above to be a short-term solution, while other models are developed. Over the longer-term, Gold Standard may explore two further models:

The creation of an Application Programming Interface (API) or similar software interface connected to the Gold Standard Impact Registry, which enables a more direct tokenization of VERs on a third-party platform and allows for automated two way communication between the Registry and third-party platform. The direct creation of on-chain representations of Gold Standard credits by Gold Standard, which is sometimes referred to as 'native tokenization'.

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

- **ANSWER:** Yes, while further questions may arise when its operational details come into sharper focus, THF believes that implementing this custodial account model will satisfactorily address the chief complaint motivating its development: the public confusion thought to have arisen when certain third-party DLT companies retired VERs prior to tokenization.

Ironically, where such confusion occurred, it was an unintended consequence of efforts by these DLT platforms to address perceived deficiencies of transparency and operational speed in the existing registry system. Public ledgers, by their nature, are more transparent. They are capable of recording transactions instantly, immutably, and with far greater levels of security. Retiring purchased VERs prior to tokenization was a stop-gap measure intended to leverage those advantages of DLT by bringing the credits entirely on-ledger. To the extent, however, that retirement of subsequently tokenized VERs signals consumption of their environmental benefits prior to its occurrence in fact, establishing the type of custodial accounts envisioned solves that problem. It keeps GS VERs that have been tokenized on third-party platforms isolated from VERs that have not, on the GS registry.

Of course, it is equally also important to keep the status of VERs held in custody synced with their on-chain counterparts. In contrast to the central registry-managed "immobilization accounts" being contemplated by Verra, GS' custodial account model seems to vest this responsibility in token issuers. THF takes no position on whether GS or its contractually authorized Web3 partners are better positioned to ensure that VERs are promptly retired when corresponding tokenized credits are burned. In both scenarios, the DLT platform has the burden, either to disclose when a VER-backed token is burned on-chain or to act on that information themselves by retiring its underlying VER held in custody on the registry. Either way, GS would be notified in the ordinary course if a VER-backed credit is minted or its underlying VER transferred into a custodial account.

- **QUESTION:** Do you consider it appropriate for Gold Standard to explore 'native tokenization' in the future?
- **ANSWER:** GS frames its custodial account model as temporary, but what counts is whether market participants can easily and transparently verify:

1. the identity of all entities approved by GS to tokenize VERs;

2. details of the tokenization process used by those entities; and
3. up-to-date information about the attributes of the VERs that have been tokenized and real-time status of their on-chain twins.

In a distributed ledger environment, these data flows are not only equally accessible to all parties, but susceptible to automation. Properly implemented, the custodial model would not seem to suffer from any major weakness compelling GS to pursue native tokenization. Is exploring native tokenization “inappropriate”? No, but what precisely is the problem that GS solves – vis-a-vis our shared goal of healthy VCMs – by embracing native tokenization? With this question top of mind, THF urges GS to be mindful of two strategic risks:

First, like other registries, GS currently operates as a quasi-regulatory body. It does so against the backdrop of myriad policy challenges affecting VCMs that reduce public trust, depress the carbon price, and many argue demand government regulation, oversight, and enforcement to address effectively. In their absence, GS must take great care to preserve its credibility by avoiding conflicts of interest. This means ensuring that GS is not – and cannot be reasonably perceived to be – motivated by commercial self-interests.

If GS were to begin directly creating on-chain representations of GS VERs on an exclusive public DLT, rather than pursuing an open innovation approach, it may slow investment and innovation by third-party DLT companies working to scale the VCMs in partnership with GS. In some jurisdictions, such a move could appear anticompetitive. But even without the perception of bias, THF would urge the GS to avoid “picking winners and losers.” Prematurely backing one network, application, or technology over another runs the risk of chilling innovation across this highly dynamic landscape.

- **QUESTION:** Would you like to share any additional comments on this topic?
 - **ANSWER:** THF offers no response to this item.

(2.2) HOLDING, RETIREMENT AND REPORTING

To support transparency and the avoidance of double counting, and to enable Gold Standard to continue to effectively manage information related to credits it has issued, there are certain responsibilities that organizations creating digital tokens representing Gold Standard credits will need to take. Gold Standard proposes to require that organizations must:

1. *Ensure that any VERs retired or canceled in full on a third-party platform (referred to as ‘burning’ on some web3 platforms) must be irreversibly retired on the Gold Standard Impact Registry with no undue delay.*
2. *Provide an option for entities to ‘de-tokenize’ GS VERs, ensuring that the digital representation of the GS VER is irreversibly canceled, and that the original GS VER can be transferred and retired by account holders within the Gold Standard Impact Registry without a risk of double use.*
3. *Ensure that digital tokens representing Gold Standard carbon credits created on a blockchain-based platform contain sufficient publicly available information for third parties to clearly associate the digital representation with the original carbon credit in the Gold Standard Impact Registry. We propose to require that organizations include a link to all relevant information listed on the Gold Standard Impact Registry via the unique URL for the credit block, and/or include at least the serial number, vintage and associated project ID for all carbon credits represented as digital tokens on their platform.*

4. *Report at least quarterly to Gold Standard with information on:*

- I. *VERs that the organization has represented as a digital token, including as a minimum information on the serial number, vintage and associated project ID*
- II. *VERs that have been retired or canceled on the organization's platform, including as a minimum the same information.*

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

- **ANSWER:** THF agrees that organizations creating digital tokens representing GS VERs have a responsibility to help GS ensure transparency and avoid double counting. We generally support each of GS' four proposals detailed above.

With respect to requiring organizations to irreversibly retire GS VERs “with no undue delay” when their tokenized equivalents are retired on ledger, or “burned,” we agree. Permitting any VERs on which burned tokenized credits are based to persist on the Registry may cast doubt on the viability of all such VERs. But the requirements GS imposes to enforce this should be careful not to chill participation. With a gap of nearly \$4 trillion in climate finance projected through 2050 (according to a 2021 McKinsey study), we will need the innovations of DLT startups. To soften the burden of compliance, THF suggests that GS explore a phased transition, where the stringency of compliance obligations increase over time, giving affected companies time to prepare.

THF also favors creating an option for entities to “de-tokenize” GS VERs, sometimes referred to as two-way bridging, but would offer the following observations and cautions. We believe that VCMs will steadily and irrevocably move toward public ledgers, where digital environmental assets will be cryptographically linked to robust dMRV-enabled audit trails. Due to this efficiency, two-way bridging capability will be less necessary, and GS will be able to issue credentials and attestations to actors and methodologies as assertions of quality in the form of Verifiable Credentials. In transition, however, allowing tokenized credits to revert to their source registries is prudent because it ensures that, should any given third-party platform be disrupted, a means exists to return tokenized VERs to GS custody, either permanently or temporarily (i.e., to enable those VERs to be safely transferred to another DLT network). GS should build its infrastructure so that all VERs have the potential to reap tokenization's benefits, from immediate global settlement, to double spend protection, to enhanced market access and linkage to DeFi applications.

However, GS should also be attentive to three scenario risks: (1) that tokenized carbon credits become inaccessible (e.g., keys are lost); (2) that platforms with which GS is directly partnered are hacked and tokenized credits are stolen; and (3) that de-tokenization is requested by end-users of tokenized VERs (i.e., the entities seeking to bank their environmental benefits) or other parties farther down the value chain with whom GS lacks contractual privity. THF recommends that de-tokenization be disallowed in the first scenario. Registries such as GS should not operate – intentionally or unintentionally as insurers against digital-asset loss. Rather, where tokenized VERs can no longer be accessed, or if they remain inactive – i.e., held without consumption of their environmental benefits – beyond a fixed period, GS should require transfer of the underlying VERs out of their custodial accounts for retirement. Similarly, we recommend that de-tokenization be denied in cases of theft. GS' focus should remain on ensuring asset and market integrity. Where a tokenized credit is stolen, it remains in circulation. To

allow de-tokenization would be to sanction double counting in the name of consumer protection. Lastly, THF suggests that GS consider limiting requests for de-tokenization only to its first-order contractual partners, not consumers or end users. Among other concerns, administrability might be unreasonably burdened without such a restriction.

- **QUESTION:** 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?
 - **ANSWER:** THF regards timely retirement of VERs held in custody when their corresponding VER-backed tokens are burned as critical. Quarterly reporting to GS about VERs “retired or canceled on the organization’s platform” is likely adequate if this implies burning on ledger, and if DLT organizations themselves are responsible for retiring the corresponding VERs stored on the registry. If, on the other hand, GS envisions retiring those VERs itself, and only four times a year, THF worries that cadence is too slow. On balance, however, THF would prefer it if DLT entities partner with GS to develop and deploy an automated system capable of retiring VERs as soon as their corresponding VER-back tokens are burned.
- **QUESTION:** We are aware that some organizations 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?
 - **ANSWER:** With respect to fractionalization, THF suggests that GS be mindful of potential jurisdictional differences in the legal treatment and policy implications of fractionalization across national and subnational environmental and crypto regulatory frameworks.

Legally, a tokenized GS VER might be understood, for example, as intangible property in one jurisdiction, or as a collection of rights enforced in contract in another. It may be created, traded, or retired/burned in the absence of existing climate policy infrastructure, or within the statutory context of a mandatory emissions trading system (ETS). This in turn might be open or closed – i.e., surrender of credits purchased outside a national ETS’ particular allowance allocation systems might be permitted to show compliance subject to quantitative and qualitative restrictions, or might not. Similarly, GS should be alert to the difference between the legal status of fractionalized credits themselves versus regulatory constraints that may be placed on transactions. In the United States, fractionalizing credits is unlikely, without more, to earn regulatory treatment as a derivative. The better analogy might be issuance of fractional shares of stock by publicly listed corporations, which is generally permissible.

As to policy, THF sees certain policy advantages to fractionalizing VERs, including promoting climate justice and inclusion (especially in the Global South) and helping expensive technology-based carbon removal solutions (TbS) scale. The price of carbon is widely expected to rise sharply in the coming decades. Whatsoever, it is essential for this to occur. But today, the developing world struggles to obtain access to climate finance, so as to invest in decarbonization locally. Meanwhile, carbon removal and storage technologies – e.g., mineralization, ocean-based carbon removal, and direct air capture – have a critical part to play in achieving global climate goals, but currently generate less than 1% of carbon credits available on the market. By some estimates the world needs ~1,000,000 times existing annual carbon removal capacity (equivalent to 5-16 net-new gigatonnes per year) by 2050. No single technology will be sufficient alone, but emissions reductions are occurring too slowly, and the world lacks enough arable land to rely on forestry projects. By fractionalizing GS VER-backed credits on public ledgers,

the customer base for higher-cost TbS broadens dramatically, potentially helping these companies secure the upfront capital necessary to increase production.

However, THF also suggests that GS consider if there are tensions between supporting fractionalization and working toward integration of GS VERs (or outside credits issued by others) for compliance use with the >60 emissions trading systems now operating or coming online worldwide. Without safeguards, natively fractionalizing credits at scale could decelerate progress toward that goal. Most national and subnational governments structure their ETS compliance obligations around allowances representing one mtCO₂e each, which to our knowledge are rarely if ever fractionalized. In addition, eligibility criteria are frequently employed that may be difficult or impossible to satisfy if fractionalized credits with different attributes were later bundled into one mt units. This concern is not necessarily insurmountable – e.g., GS might require tokenizing parties to retire only full credits from GS – but deserves careful review.

- **QUESTION:** Would you like to share any additional comments on this topic?
 - **ANSWER:** THF approves of GS' focus on making available sufficient information for members of the lay public to be able to reliably match GS VERs held in custody in the registry with their corresponding VER-backed carbon credit tokens on ledger. We agree that data fields should include at least the unique URL for the credit block, the serial number, the vintage, and the associated project ID. But GS is in a position to implement other safeguards, too, beyond transparency. Specifically, THF encourages GS to explore authorizing only those Web3 platforms using best-in-class dMRV. Emerging policy workflow tools, such as the SIF-funded Guardian application on the Hedera network, now enable Web3 platforms to bring carbon credits on-chain with a far higher level of confidence in their environmental integrity, both at the asset level and the project level. By digitizing open-source methodologies and implementing them using dMRV, the entire lifecycle of tokenized VER becomes transparent, auditable, and traceable, including identity, provenance-chain, and emissions history data. This will further reduce fraud and double counting. Therefore, GS should explore asking third-party DLT platforms seeking to bridge GS credits on chain to pledge to utilize best-in-class dMRV tooling. At a minimum, GS should avoid data requirements that unduly restrict the capabilities of dMRV (e.g., by imposing overly strict format requirements for specific data fields, as defined above).

In addition, THF notes the many voices beginning to speak out about the (im)permanence of nature-based projects due to fast-increasing risks of reversals (due to extreme heat, forest fires, flooding, drought, etc.). We believe that GS should issue VERs only where a project owner has demonstrated an environmental benefit (e.g., that trees have been planted) backed by data (e.g., on-site sensors) audited by an independent third-party against a baseline. But GS' responsibility cannot end upon issuance. If that environmental benefit is diminished, degraded, or lost entirely post-issuance, the value and validity of the associated VER is compromised. THF urges GS to explore emerging tools and policy strategies to account for and mitigate escalating reversal risk. One path again involves dMRV, which can enable accuracy and cost-effective tracing, discovery, and continuous auditing of the environmental attributes of nature-based projects at risk of reversal. In this way, GS could exert virtuous upward pressure on carbon-removal project quality, which over time should increase asset values in turn.

(2.3) POOLING

Several organizations creating digital tokens representing carbon credits apply the practice of 'pooling', under which carbon credits that meet certain eligibility criteria are pooled together and represented by a generic

token rather than a token that is specific to an individual carbon credit. An example is the Base Carbon Tonne (BCT) created by Toucan. This is broadly similar to the use of contracts on traditional exchanges, such as the Global Emissions Offset (GEO) created by CBL.

Gold Standard is mindful that by the nature of pools or contracts, carbon credits entered into the pool or contract would all be expected – in the absence of new innovation – to attract the same price. If Gold Standard credits were pooled with credits from other standards, this may therefore be disadvantageous to many projects registered with Gold Standard, if they are currently able to sell credits at higher prices. At the same time, Gold Standard understands that the ability to sell credits into pools may also be attractive to some project developers.

Gold Standard is inviting views from stakeholders on whether it should apply restrictions on the ability of organizations to pool Gold Standard credits with credits from other standards and, if so, the nature of these restrictions.

- **QUESTION:** Do you think that Gold Standard should consider restrictions on the ability of organizations to pool its issued credits with credits from other standards. Why?
 - ANSWER: THF regards any discussion of such restrictions to be premature. The VCMs currently are not subject to significant regulatory oversight, but the landscape is changing and increased government scrutiny is possible across several jurisdictions in the future. This will happen in parallel to the emergence of new legal rules and guidance for participants in or adjacent to the crypto economy, including sustainable Web3 companies looking to tokenize GS VERs to mobilize capital for climate action.

Presently, the best legal treatment – at least in the United States – of GS VERs would be as commodities; the Commodity Exchange Act (CEA) defines commodities sufficiently broadly to bring carbon credits under CFTC jurisdiction. One challenge with pooling arises from variances in the quality, expressed in terms of the environmental attributes, of the credits to be pooled. Putting aside fractionalization, each tokenized VER represents digitally one GS VER stored on the Registry. In turn, each GS VER represents one mtCO₂e reduced or removed from the atmosphere by a specific technology- or nature-based project. But not all such projects are created equal. One of the advantages of tokenized credits is that DLT enables auditability of carbon credit-backed tokens, exposing their attributes to public scrutiny and incentivizing project-level compliance improvement.

In token issuance for those using the Guardian on Hedera, most projects, if not a large portion of the Hedera community, use non-fungible tokens unique to the metric tonne with an auditable link to dMRV data as specified in a digitized methodology called a policy. Each project once issued, which could be credentialed by Gold Standard could be pooled in a variety of ways including to be made more fungible by wrapping multiple classes of similar non-fungible tokens into a pool, however a pool could also be 1000 unique classes of token tied to many different methodologies as a technical mechanism for viewing data and not used for tokenization of a new asset creation and fungible trading. It is imperative that the concept of a “technical” pool is not disallowed for enabling markets with multiple assets from multiple registries and could be an unintentional consequence of wide disallowal and a major hindrance to innovation.

Perhaps this transparency benefit is in some mild conceptual tension with pooled tokens if pooling implies that the environmental attributes of the underlying credits are identical; however, variances in the quality of commodities are nothing new, nor unique to DLT, and in legacy markets these differences are routinely disregarded for the purpose of

discharging settlement obligations. If care is taken to pool only tokens backed by credits with similar attributes – in essence, to apply minimum standards of quality and grading – THF is not certain why pooling tokenized VERs per se gives rise to an increased risk not carried by any effort to aggregate a commodity.

Yes, because pooling could be implemented in a variety of different ways, it may carry some elevated risk of securities treatment. But this outcome would be contingent on specific facts in each case. SEC jurisdiction is by no means guaranteed. Nor would GS bear the risk if it were—no more than any issuer of assets (e.g., debt obligations) sold to and later pooled by third parties to create an asset-backed security. Risk arises not from tokenization per se, but the attributes of the underlying assets themselves.

GS' core expertise lies in ensuring that carbon reduction and removal projects maintain environmental integrity, so that confidence stays high that each and every GS VER reflects one mtCO₂e actually reduced or removed.

- **QUESTION:** If the answer to the above question is yes, do you have views on how any restrictions could operate? Would you like to share any additional comments on this topic?
 - **ANSWER:** Pooling also has countervailing policy advantages, especially in the Global South, where it can be used to incentivize carbon reduction and removal activities at much smaller scales than would be cost-effective otherwise, which increases capital flows to developing economies. Accordingly, THF does not support restrictions on pooling at this time.

(2.4) Due Diligence

Gold Standard already requires all organizations intending to open and manage an account in the Gold Standard Impact Registry to undergo Know Your Customer (KYC) checks, involving the provision of documents related to the organization's incorporation, management, the nature of its business and how it intends to use its registry account. As a minimum, Gold Standard will require all organizations intending to create digital tokens representing Gold Standard credits to fulfill these existing requirements.

Gold Standard is though mindful that the organization creating an on-chain representation of a Gold Standard credit will only represent the first layer of interaction. In some cases, other organizations may then create derivative tokens or other crypto-assets based on the original representations, which would not be subject to these KYC checks conducted by Gold Standard. Considering the ability for entities to act anonymously when using blockchain-based platforms and cryptocurrencies, this may introduce either real or reputational risks for Gold Standard and its stakeholders. At the same time, Gold Standard is mindful that secondary due diligence checks are not required in other cases, where credits are transacted without the use of blockchain.

Gold Standard is therefore seeking views from stakeholders on the extent of the due diligence requirements that should be introduced in cases where organizations intend to create on-chain representations of Gold Standard credits.

- **QUESTION:** Is it sufficient for organizations 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?
 - **ANSWER:** THF offers the following observations: First, GS should be alert to changes in the global regulatory frameworks applicable to both crypto instruments and ESG compliance. Social pressure is rising across multiple jurisdictions for governments to do more. We believe avoiding fragmented legal requirements that may hinder innovation where these domains intersect is critical to supporting accelerated growth of VCMs.

Existing standards-setting bodies such as GS—independent, credible, widely adopted—represent these markets’ best chance for near-term regulatory certainty through robust industry consensus on governance, compliance, and market-integrity assurance.

Accordingly, THF recommends that GS first carefully tailor any KYC screening of Web3 platforms to match the current and developing legal requirements of each jurisdiction within which GS now operates, or will do so in the future. This tailoring should be underpinned by and closely follow appropriate legal opinions by outside counsel authorized to practice in the relevant jurisdiction. Originally, KYC guidelines arose in connection with securities trading and banking, to combat fraud, money laundering, and other types of financial crime. Existing, off-chain carbon markets have been attacked for creating a potential for both errors and fraud between participants (due to the heterogeneous nature of credits) as well as money laundering risk (due to the lack of price transparency). THF is not aware of evidence showing that either carbon credits as an asset class or their tokenization on Web3 platforms drives these risks over rates of illicit finance seen in legacy markets. But nor can Web3 platforms be held to lesser standards. Implementing KYC best practices is necessary to ensure the credibility of and avoid reputational damage to voluntary carbon markets as they scale on-chain.

For these reasons, GS may wish to consider aligning its KYC checks with regulatory guidance mechanisms operating at the international level, such as FATF. Likewise, GS may benefit from seeking clarity from international accounting bodies (e.g., IFRS and GAAP) on how tokenized carbon ought to be treated on the balance sheet, and requiring, via contract, in its Terms of Use, conforming treatment from its downstream platform-partners.

However, even as we recommend that GS limit its KYC activities to existing requirements, THF would also note that DLT capabilities are overtaking legacy rules developed for traditional finance against the legal backdrop of governing statutes decades old. Today, when a VER is bridged on-chain, technologies such as the Hedera Token Service allow platforms to configure and enable KYC features directly on the resulting token. This might include identity attributes such as business name and address or corporate officers and registered agents, but also integrate any type of off-ledger authentication GS may wish to require, from publicly available emissions data, announced climate targets, sustainability claims and commitment, ESG ratings history, related litigation, securities and environmental regulatory filing, submissions to entities such as SBTi and CDP, as well as carbon-credit transaction (buy/sell dates, quantities, unit and total price, etc.) and/or deployment information (offset usage claims, third-party auditing data, etc.).

While prudence and the prevention of illicit finance may warrant all the usual KYC checks be performed on Web3 platforms, GS should be mindful of the potential of DLT to be more secure, not less. We therefore recommend that GS require – via contract, in its Terms of Use – any third-party Web3 platform seeking to bridge VCUs on chain to utilize technology capable of fully enabling whatever KYC attributes GS selects.

- **QUESTION:** Do you think that Gold Standard should introduce requirements related to the due diligence checks that organizations creating digital tokens representing Gold Standard credits apply for their own users?
 - ANSWER: As a practical matter, GS may have limited power to shape how and to what extent third-party DLT companies tokenizing GS VERs perform due diligence on their users, customers, or B2B partners. Certainly, platforms authorized by GS to tokenize VERs held in GS custodial registry accounts should be required to undergo and pass GS’

usual partner-vetting bar. Simply as a matter of contract law, it is likely that GS could also impose legally valid terms – e.g., via its terms of use or a side agreement, such as a Supplier Code of Conduct – obligating them to mirror its due diligence standards and procedures.

However, this approach carries hidden risks of reputational damage and oversight scrutiny. GS lacks the resources – staff, time, funding, and institutional expertise – to reliably and cost effectively verify let alone credibly enforce compliance with enhanced downstream customer- and partner-vetting requirements imposed on Web3 platforms. Even if effective compliance oversight were possible, GS has no power to compel specific performance with those due diligence practices. GS’ exclusive remedy – available only following unambiguous evidence, a court-issued determination, or a clear admission of breach of GS’ terms of service – would likely be revocation of the Web3 entity’s right to continue tokenizing GS VERs.

Instead, THF recommends that GS require its partners to certify that they have sought competent legal advice on their compliance assurance obligation under existing regulation in the jurisdictions in which they operate. In addition, we suggest that GS require its partners to certify that they have consulted with and weighed the advantages of retaining the service of a leading blockchain analytics provider, so as to reduce the risk of inadvertent sanctions violations.

- **QUESTION:** Are there examples from other sectors that you believe could be learned from?
 - ANSWER: THF offers no response to this item.
- **QUESTION:** Would you like to share any additional comments on this topic?
 - ANSWER: THF offers no response to this item.

(2.5) SUSTAINABILITY

The greenhouse gas emissions associated with the operation of blockchain technologies vary significantly from platform to platform. Blockchains using a ‘proof-of-work’ mechanism, which includes Bitcoin, can require significantly more energy and therefore may contribute significantly higher greenhouse gas emissions than blockchains using a ‘proof-of-stake’ mechanism.

Gold Standard is of the view that the sustainability of the blockchain matters, in the context of its decision to approve requests by organizations to create on-chain representations of Gold Standard credits. There is the potential for higher emissions, as well as reputational harm, by permitting the creation of on-chain representations using higher-emitting blockchain technologies, in particular considering that more sustainable alternatives exist.

Gold Standard therefore proposes introducing a requirement that organizations creating digital tokens representing Gold Standard credits must either:

- 1. Ensure digital tokens exist only on a blockchain that uses a proof-of-stake mechanism, or*
- 2. In cases where the blockchain does not use a proof-of-stake mechanism, provide at least one independent, peer-reviewed analysis demonstrating that the blockchain technology has a direct emissions footprint (i.e., prior to any offsetting) that is significantly lower than those using a proof-of-work mechanism (see question below on the benchmark for this).*

In the future, Gold Standard expects that it would establish an approved list of blockchain technologies to

streamline this process for applicant organizations.

Gold Standard invites views from stakeholders in particular on the workability of these proposals, the appropriate benchmark to set for the emissions footprint of blockchain technologies, and any existing third-party source of evidence on the emissions footprint that could be used to inform its approach and decisions.

- **QUESTION:** Do you agree that Gold Standard should apply restrictions related to the emissions footprint of blockchain technologies?
 - **ANSWER:** As a default principle, THF heartily agrees with GS that when DLT organizations focused on sustainability develop applications of distributed ledger technology purpose-built to return benefits to the climate, those organizations and those applications must accomplish their climate-forward missions without unduly burdening the environment. How should GS operationalize this principle? THF offers the following observations:
 1. Distributed ledger technologies create environmental pressures in several ways, including power consumption from mining/minting, digital asset transactions, and network operations, from the GHG emissions associated with the generation of that electricity, from e-waste, and from the carbon footprint of the human beings responsible for maintaining, operating, and developing applications for DLT networks, as well as other inputs not unique to DLT. Measuring and comparing the emissions of multiple, competing DLT networks is possible, but more complex and fact-intensive than simply whether one uses a more energetically intensive proof-of-work (PoW) protocol while others use proof-of-stake. Yes, other things equal, PoW has greater power requirements than proof-of-stake. As a result, PoW applications reflect higher carbon intensity than those running on proof-of-stake networks—in general.

But while true at high altitude, the details can matter. GHG emissions from electricity consumption are a function of the energy mix used to generate that electricity. A third-party Web3 platform tokenizing GS VERs using the Bitcoin network could theoretically imply lower emissions than a competitor using a dramatically more thrifty network if the former mints credits exclusively at off-grid mining facilities co-located with solar or wind projects.

Likewise, two ultra-low energy networks using similarly designed proof-of-stake implementations may consume near-identical amounts of electricity to operate at parity, but where one depends to a significantly greater extent on consumables (e.g., off-chain storage devices) with short operational lives, the delta in e-waste volume may be substantial.

The point is that fair estimates can be made of the relative carbon intensity of competing DLT networks and the comparative environmental footprints of the climate-forward DLT organizations using them to bridge GS VERs on chain. However, absent comprehensive analysis of each company's respective environmental impacts (scope 1-3, energy mix, DLT protocol, IT base, operational sustainability, water use, etc.), GS should approach inter-network comparisons with some caution.

2. Nevertheless, THF does not object to GS establishing, on a provisional basis at least, a rebuttable presumption against the suitability of Web3 platforms using

proof-of-work blockchains to tokenize and trade GS VERs. We would propose that such a presumption could be overcome in two ways: demonstrating that renewable energy sources (i.e., wind, solar, hydroelectric, and geothermal) are exclusively used to power that network; or, alternatively, that it provides utility to the VCM landscape only available from a power hungry, compute intensive network.

3. As to GS creating a default presumption that networks using a proof-of-stake mechanism are suitable, THF would again urge GS to proceed carefully. As noted in regard to e-waste, proof-of-stake networks are not all equally green. Nor will independent, peer-reviewed analyses showing a blockchain's direct emissions always be readily available, but credible evidence of the environmental bona fides of other consensus methods may nevertheless be available to GS (e.g., showing proof-of-history, proof-of-authority, and RCPA, among other, achieve security with substantially less electricity consumption).
 4. Long term, there are clear efficiency benefits to GS creating an approved list of sustainable distributed ledger technologies and DLT organizations. But countervailing risks also exist of inadvertently ossifying the crypto-climate landscape by anchoring prematurely on technologies reasonably likely to be replaced with more efficient, higher sustainability innovations faster than GS could update its "approved" list.
 5. Accordingly, THF recommends that GS require all its partners – DLT and traditional partner organizations alike – to measure their organization's Scope 1 and Scope 2 emissions under the Greenhouse Gas Protocol and industry best practices in carbon accounting within 24 months and annually thereafter, and to commit to setting science-based targets for emissions reduction where applicable, or to have their existing targets independently verified.
 6. Simultaneously, THF recommends that GS partner with other registries where feasible – to stand up a "Sustainable DLT Tools" working group, including experts in industry stakeholders and academic experts in carbon accounting as well as DLT, which would be charged with developing and releasing voluntary consensus standards for the VCMs regarding "Best Available Control Technologies" (or BACT) for sustainably tokenizing, enabling dMRV, and trading GS VER-backed carbon credits on ledger, ideally within ~12 months. This body would be charged with answering the important question of where to set an appropriate environmental impact benchmark.
- **QUESTION:** Do you consider these proposals to be workable and, if not, why?
 - ANSWER: Here THF incorporates and directs GS' attention to its first response in Section 2.5 above.
 - **QUESTION:** Do you consider these proposals to be sufficient and, if not, why?
 - ANSWER: Here THF incorporates and directs GS' attention to its first response in Section 2.5 above.
 - **QUESTION:** 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?

- ANSWER: Here THF incorporates and directs GS' attention to its first response in Section 2.5 above. In short, yes, but to be set flexibly with respect to evolving capabilities of BACT, and to be set pursuant to an industry-wide voluntary consensus standard setting process led by a new working group focused on the same.

(2.6) DATA SECURITY

Gold Standard has measures in place to protect the security and integrity of data represented on the Gold Standard Impact Registry, and to prevent IT breaches. As is the case for all technology, Gold Standard is mindful of the potential for technologies used by third-party organizations creating digital tokens representing Gold Standard credits to be breached or for data to otherwise be at risk. This could be as a result of steps by malicious actors, or systems could also be disrupted by other factors, such as faulty design.

Gold Standard invites views from stakeholders on any requirements or safeguards that we may choose to put in place with respect to the security of technologies used by organizations creating digital tokens representing Gold Standard credits. Gold Standard will also draw on information and recommendations provided by the Working Group on Digital Infrastructure and Open APIs, established under its Open Collaboration for digital solutions in carbon markets.

- **QUESTION:** Do you agree that Gold Standard should either introduce conditions or require information related to the IT security measures that an organization is taking to protect data against breaches?
 - ANSWER: THF offers no response to this item.
- **QUESTION:** If so, do you have views or recommendations on what Gold Standard should require?
 - ANSWER: THF offers no response to this item.
- **QUESTION:** What are the primary risks that you believe Gold Standard should consider when writing its requirements on this topic?
 - ANSWER: THF offers no response to this item.
- **QUESTION:** 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?
 - ANSWER: THF offers no response to this item.

(2.7) PERMITTED UNITS

Gold Standard has identified several types of credits that may require further consideration before it provides permission for them to be tokenized. These are:

1. **Planned Emission Reductions (PERs):** PERs are issued to certain land use and forestry projects registered with Gold Standard, and represent expected future emission removals rather than verified, achieved emission removals. As such, PERs are not allowed for use towards offsetting claims and are not interchangeable with Verified Emission Reductions (VERs). Initially, Gold Standard is of the view that PERs should not be permitted for tokenization while a suitable approach and safeguards are developed.
2. **VERs authorized for use under Article 6 of the Paris Agreement:** Gold Standard expects in the future

to issue VERs that are associated with a Letter of Authorisation issued by the project's host country, permitting the VERs to be used by entities towards purposes permitted under Article 6. Under rules adopted by the UNFCCC, governments will need to report detailed information on the use of such VERs, including their use purpose and the using entity. At this early stage in the implementation of Article 6, Gold Standard is of the view that it is premature to permit the tokenization of VERs associated with an Article 6 Letter of Authorisation.

In both cases, Gold Standard envisages permitting tokenization with tailored safeguards in the future, as we are aware of organizations interested in creating digital tokens representing both types of unit.

- **QUESTION:** Do you agree with the proposal not to initially permit the tokenization of these categories of credit, until tailored safeguards are developed?
 - **ANSWER:** If tokenizing PERs is problematic, the issue may be less tokenization per se, and more the practice of ex ante crediting itself. We acknowledge the importance of forward contracts to project finance, but worry the practice of issuing tradable credits prior to full realization of the anticipated environmental benefit may cause public confusion in some circumstances. After all, certifying project performance scientifically, even out to GS' limit of five years forward, can be exceedingly difficult in some circumstances. In 2022 in the United States, historically unprecedented wildfires in eastern Washington mean that ex ante registration by GS of expected emissions reductions from forestry projects in those states six to eight months ago, no matter how rigorous or conservative the methodologies used, can likely now be proven to be overestimates ex post. This is not a problem caused by tokenization, however THF believes dMRV may play a role in mitigating it. While there is a risk of moral hazard in allowing an environmental benefit to be monetized before it is created, especially as accelerating climate change makes risks of reversal harder to predict, robust DLT-enable dMRV integrating remote sensing and satellite data could go a long way towards addressing these concerns. For these reasons, we would suggest that GS reexamine the risks of ex ante crediting in the absence of dMRV to control for the risk of trading potentially invalid PERs in all cases whether leveraging tokenization or in the absence of it.
- **QUESTION:** Do you believe there are other types of carbon credits that Gold Standard should consider creating tailored safeguards for? If so, why?
 - **ANSWER:** THF offers no response to this item.
- **QUESTION:** Would you like to share any additional comments on this topic?
 - **ANSWER:** THF offers no response to this item.

(2.8) REPUTATIONAL HARM

Gold Standard has existing provisions within its General Terms and Conditions and Registry Terms of Use that require organizations using and directly interacting with Gold Standard not to intentionally commit any act or omission that could cause harm to Gold Standard's reputation and goodwill, and that permit Gold Standard to take certain action in the event that its reputation is put at risk.

Gold Standard considers there to be specific potential reputational risks associated with links to cryptocurrencies that do not exist or are lower for other uses of Gold Standard and its credits. At the same time, our existing provisions related to reputational harm are broadly applicable and therefore could be applied for the act of creating digital tokens representing Gold Standard credits, and any further activity

derived from the original creation of these digital tokens, without change.

Gold Standard would be prepared to apply the powers that it holds under our existing terms and conditions in cases where we assess our terms related to reputational harm have been breached.

- **QUESTION:** 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?
 - ANSWER: THF would only clarify here that reputational harm does not include statements made in connection or collaboration with GS business competition. In addition, we disagree that DLT presents “specific potential reputational risks associated with links to cryptocurrencies” not presented by other GS partners—e.g., major corporates operating in carbon intensive sectors with hard-to-abate emissions, who are among the most incentivized to purchase GS credits. According, THF does not agree that similar reputational risks “do not exist or are lower for other uses of Gold Standard and its credits.” However, given that GS has not signaled an intent to apply more stringent terms to our industry, and THF regards GS’s existing terms as consistent with standard practice across multiple industries, no changes are necessary.
- **QUESTION:** If not, what amendments or additions do you believe are needed?
 - ANSWER: Pursuant to THF’s first response in Section 2.8 above, we believe no amendments or additions are needed at this time.
- **QUESTION:** Would you like to share any additional comments on this topic?
 - ANSWER: THF offers no response to this item.