УДК 336.763:004.946

TOKENISED GREEN BONDS IN THE ARCHITECTURE OF SUSTAINABLE FINANCE AND THE FORMATION OF THE GREENIUM

ТОКЕНІЗОВАНІ ЗЕЛЕНІ ОБЛІГАЦІЇ В АРХІТЕКТУРІ СТАЛИХ ФІНАНСІВ ТА ФОРМУВАННЯ ЗЕЛЕНОЇ ПРЕМІЇ

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Abstract. *This article develops a greenium-centred analytical framework for tokenised green bonds and explains when tokenisation can influence green bond pricing rather than merely digitising issuance. The framework treats the greenium as a fragile equilibrium outcome shaped by three interacting channels: (i) liquidity and market microstructure, including settlement finality and interoperability with mainstream custody and post-trade arrangements; (ii) credibility of green claims, driven by the cost and quality of verification, disclosure integrity, and the auditability of allocation and impact evidence; and (iii) lifecycle frictions embedded in issuance, servicing, reporting, and assurance. By linking these channels to a tiered architecture – legal governance, registry and custody, settlement (including the "cash leg"), and a disclosure-data-attestation stack – the article clarifies why many tokenisation pilots fail to translate operational innovation into pricing effects. Evidence from sovereign and corporate cases is used to illustrate channel activation: Hong Kong's repeated, multi-currency digital green bond issuances demonstrate the importance of scalability and investor accessibility for reducing novelty-related liquidity discounts. In contrast, corporate initiatives highlight the roles of legally recognised registers and data-centric reporting infrastructures. The analysis further discusses the relevance of monetary surrogates, stablecoins, and central bank digital currencies as potential settlement assets enabling delivery-versus-payment in tokenised securities markets. For Ukraine's reconstruction-oriented sustainable finance agenda, the framework implies that tokenisation is most justified where it strengthens verifiable transparency, reduces verification and reporting burdens, and preserves interoperability with established capital-market infrastructure. The article presents a coherent market-design perspective that integrates financial engineering, structured finance, and digital asset infrastructure into a sustainable analysis of debt pricing.*

Keywords: *tokenised green bonds; greenium; blockchain; asset tokenisation; digital assets; virtual assets; monetary surrogates; stablecoins; central bank digital currencies (CBDC); delivery-versus-payment (DvP); settlement finality; interoperability; disclosure integrity; impact reporting;*

structured finance; risk management; Ukraine reconstruction finance.

***Анотація**. У статті запропоновано аналітичну рамку для токенізованих зелених облігацій, у центрі якої перебуває «greenium» як результат ринкової рівноваги, а не як автоматична премія за маркування. Рамка пояснює, за яких умов токенізація здатна впливати на ціноутворення зеленого боргу, а не лише оцифровувати випуск. Доведено, що greenium формується взаємодією трьох каналів: (1) ліквідності та мікроструктури ринку, включно з фінальною розрахунковою визначеністю й інтероперабельністю з основною кастодіальною та посттрейдинговою інфраструктурою; (2) довіри до «зелених» тверджень, що залежить від вартості та якості верифікації, цілісності розкриття інформації та аудитовності доказів щодо розподілу коштів і впливу; (3) фрикцій життєвого циклу інструменту – витрат на емісію, обслуговування, звітність і assurance. На прикладі суверенних і корпоративних кейсів показано, що масштабованість і доступність для інвесторів є критичними для зниження «новизняних» дисконтів ліквідності, тоді як правове визнання цифрового реєстру та даноцентрична архітектура звітності підсилюють канал довіри. Окремо обґрунтовано роль грошових сурогатів, стейблкоїнів і CBDC як розрахункових активів для DvP у токенізованих ринках. Для України зроблено висновок, що токенізація є найбільш виправданою там, де вона підвищує верифіковану прозорість і знижує вартість звітності без втрати інтероперабельності.*

***Ключові слова:** токенізовані зелені облігації; greenium; блокчейн; токенізація активів; цифрові активи; віртуальні активи; грошові сурогати; стейблкоїни; CBDC (центробанківські цифрові валюти); доставка проти платежу (DvP); фінальність розрахунків; інтероперабельність; цілісність розкриття інформації; звітність щодо впливу; структуроване фінансування; управління ризиками; фінансування відновлення України.*

Introduction. Green bonds have matured from a niche segment into a systemic component of sustainable finance, yet the market remains constrained by structural inefficiencies that distort pricing and limit participation (*Spydra, 2025*). While the financial promise of these instruments is standardised, the environmental promise remains heterogeneous and costly to verify, creating a classic information asymmetry problem between issuers and investors (*NGFS, 2022*). The issuance process is hindered by high transaction costs associated with tracking, reporting, and external review, which act as a barrier to entry for smaller issuers and create friction in secondary markets (*ICMA, 2025*). Consequently, the efficiency of capital allocation is dampened not by a lack of demand but by the operational opacity and verification lags that characterise the current market infrastructure (*NGFS, 2022*).

These frictions are economically significant because they directly interact with the formation of the 'greenium' – the yield differential that incentivises issuers to bear higher compliance costs. This premium is not an automatic, label-driven reward, but rather a fragile market equilibrium that is sensitive to liquidity conditions and the credibility of green claims. Tokenisation, often reduced to a discussion of technological novelty, must instead be analysed as a market-design intervention capable of altering this equilibrium. If tokenisation functions merely as a digital wrapper without addressing the underlying costs of trust and settlement, it fails to correct the market failures that suppress the greenium; however, if it reshapes the informational and operational architecture, it has the potential to transform the economics of sustainable finance.

The purpose of this article is to develop a greenium-centred analytical framework that links tokenised green bond design choices to pricing outcomes through liquidity, credibility, and lifecycle-friction channels. It aims to substantiate this mechanism using the Hong Kong sovereign programme and selected corporate cases, deriving implications for Ukraine's reconstruction-oriented sustainable finance agenda.

Literature review. Empirical research on the pricing of green bonds converges on the finding that green premia are conditional outcomes rather than guaranteed rents. Evidence from corporate bond markets suggests that the average premium is often modest and exhibits considerable heterogeneity across issuers and currencies, indicating that the market struggles to consistently price

environmental attributes (*Zerbib, 2019*). Crucially, studies modelling 'green credibility' demonstrate that investors price governance signals that reduce information asymmetry regarding the use of proceeds, implying that the cost of verification is a determinant of the yield (*Dekker et al., 2025*). Conversely, where liquidity is constrained, or the environmental claim does not materially alter investor beliefs, evidence of a meaningful greenium is frequently weak or absent (*Larcker & Watts, 2019*). This literature strand suggests that any mechanism aiming to strengthen the greenium must address the structural determinants of liquidity and trust rather than relying solely on labelling.

Parallel to the pricing literature, institutional analyses frame the adoption of distributed ledger technology (DLT) as a coordination problem rather than a purely technological upgrade. Policy-oriented syntheses emphasise that the scalability of tokenisation depends on enabling conditions such as interoperability, legal certainty, and governance standards that prevent market fragmentation (*OECD, 2024*). Similarly, market-facing frameworks argue that while tokenisation offers a pathway to reduce reconciliation costs, these gains are contingent on operating models that allow legacy institutions to adopt new infrastructure without prohibitive transition costs (*World Economic Forum, 2025*). In this context, recent assessments of Hong Kong's pioneering initiatives confirm that digital innovation can significantly enhance the impact of green finance, provided it is underpinned by a supportive ecosystem (*Namoniuk & Matei, 2025*). Ultimately, the economic validity of a tokenised instrument rests on the legal recognition of the digital register as the definitive record of ownership, as illustrated by issuances under frameworks like Germany's Electronic Securities Act (*Siemens, 2023*), and on adherence to market standards such as the Green Bond Principles (*International Capital Market Association, 2025*).

Main results of the research. Tokenised green bonds have moved from isolated proof-of-concept transactions toward a recognisable, albeit still small, segment of sustainable debt that combines green bond governance with digital issuance and servicing architectures. A deal-level review of the market identifies nine tokenised green bond transactions across seven jurisdictions between February 2019 and February 2024, with an aggregate volume of about 1,15 billion, spanning sovereign, supranational, and corporate issuers (Asset Tokenisation*, 2024*). In Europe, green and ESG-linked tokenised bond issuance reached approximately €483 million in 2024, accounting for around 28% of the total tokenised fixed-income volume in the region. This signals that sustainability-linked use cases are becoming one of the leading application layers within the broader tokenised debt space (*Blockinvest, 2025*). Hong Kong provides the clearest benchmark of sovereign-scale progression: in November 2025, the HKSAR Government conducted its third digital green bond offering with a record issuance size of HK$10 billion, while total subscriptions across four currency tranches exceeded HK$130 billion (approximately US$16.7 billion), indicating strong institutional demand for digitally issued, multi-currency green sovereign debt (*HKSAR, 2025*). At the same time, the macro context matters for interpretation: the global green bond market is estimated to be roughly US$673 billion in 2025, meaning tokenised green bonds remain a marginal fraction of the overall green bond universe and cannot be assessed solely through growth narratives (*Mordor Intelligence, 2025*).

These figures establish momentum and policy relevance, but they do not, on their own, resolve the core economic question that determines whether tokenisation is more than a new issuance format. The key issue is whether tokenisation changes the pricing equilibrium of green debt – specifically, whether it can strengthen or stabilise the greenium by altering the constraints under which investors form yield expectations and allocate capital. Put differently, scale and subscription statistics indicate market interest, yet the analytical task is to explain the mechanism through which digital design features (fractionalisation, faster settlement, auditable disclosure trails, or automated servicing) translate into an observable pricing effect rather than remaining operational novelties (*World Economic Forum, 2025*).

A greenium-centred interpretation of tokenised green bonds becomes analytically useful only when the greenium itself is treated as an equilibrium outcome rather than a label-driven premium. The empirical literature suggests that average green premia tend to be modest and heterogeneous across markets and time (*Zerbib, 2019*), while other evidence shows settings where a meaningful premium is weak or absent (*Larcker & Watts, 2019*). This implies that the greenium is best understood as the net result of at least three interacting forces: investor preference for environmental attributes,

market microstructure and liquidity conditions, and the credibility of the "green" claim.

Where investor preference exists but liquidity is thin, or credibility is contested, liquidity discounts and credibility discounts can compress the premium. Conversely, where credibility is strong and the instrument is operationally easy to hold and trade, the same preference can translate into a more visible premium. Tokenisation matters economically only to the extent that it reshapes liquidity, credibility, and transaction frictions in ways that investors can recognise and incorporate into pricing.

A practical way to formalise this argument is to treat the observed greenium as a net pricing effect that can be decomposed conceptually into a positive preference component and three subtractive components: a liquidity discount, a credibility discount, and friction costs. Figure 1 presents the integrated framework that connects this pricing logic to the institutional design of tokenised green bonds. In the upper part of the figure, the greenium is represented as the net result of preferences minus liquidity and credibility discounts, as well as lifecycle frictions. In the lower part, a tiered reference architecture is presented, spanning foundational legal governance, market infrastructure (registry and custody), settlement (including the "cash leg" for delivery-versus-payment), and the disclosure-data-attestation stack that produces verifiable evidence of environmental performance. The key contribution of the figure is the explicit mapping between layers and channels: infrastructure and settlement layers primarily operate through the liquidity channel; disclosure, data, and attestation layers operate through the credibility channel; and the combined efficiency of the stack determines whether lifecycle frictions decline sufficiently to matter for pricing. Consequently, if tokenisation changes only the form of issuance without activating these architectural channels, by improving tradeability, settlement reliability, and the cost of verification, the framework predicts that the observed greenium will remain largely unchanged.

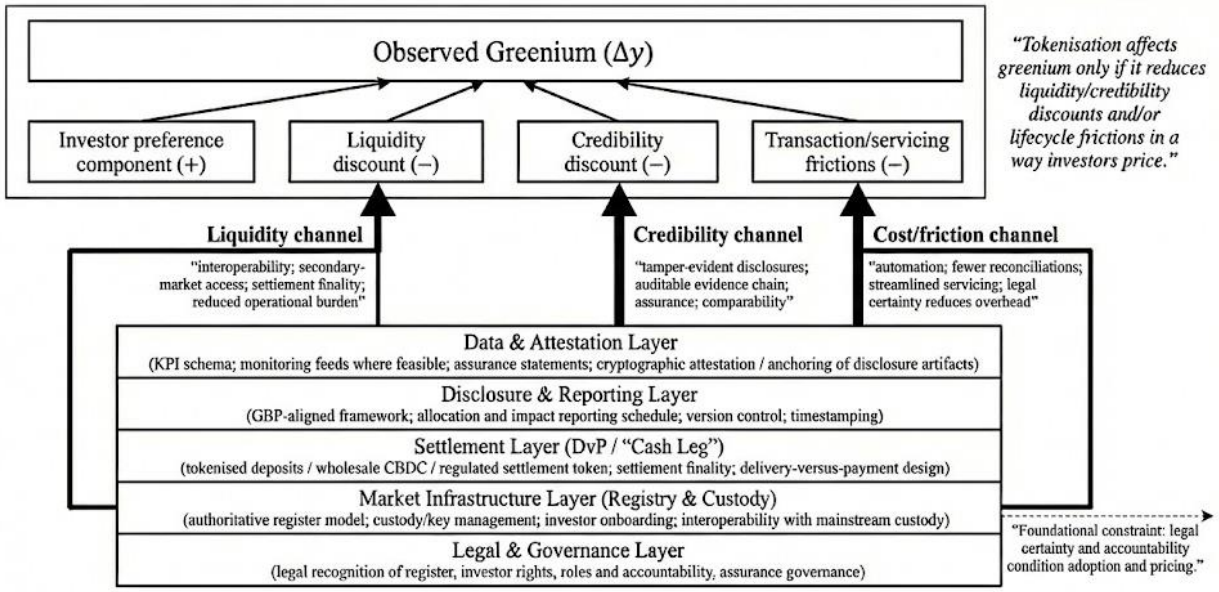

Fig. 1. Mapping Tokenised Bond Architecture to Greenium Formation Channels

Source: IOSCO, 2025

To operationalise the decomposition, tokenisation must be described institutionally rather than generically. The term 'tokenised green bond' covers materially different legal and operational arrangements, and the taxonomy determines which frictions are actually reduced and which are merely reallocated. Table 1 specifies this taxonomy in pricing-relevant terms by distinguishing between native digital issuance (where the digital register is the legally definitive record), tokenised representation or wrapper models (where the token mirrors an off-chain asset while the authoritative record remains in a traditional CSD), and hybrid designs that combine native issuance with interoperability to mainstream custody and settlement workflows. This distinction is not semantic: it determines whether tokenisation can plausibly reduce reconciliation costs and settlement frictions without imposing a new rail penalty that fragments liquidity.

Table 1. Taxonomy of Tokenised Green Bonds and Economic Implications

Tokenisation Model	Authoritative Register	Settlement Path	Expected Influence on Liquidity & Frictions

Native Digital Issuance	Digital / DLT Legally definitive record, e.g., eWpG	On-Ledger / Atomic Potential for simultaneous DvP	Mixed - high reduction in reconciliation costs. Risk of 'liquidity islands' if incompatible with mainstream workflows.
Tokenised Representation (Wrapper / Twin)	Traditional CSD (Token mirrors beneficial claim)	Legacy Rails Settlement depends on off-chain updates	Neutral - limited cost savings due to retained reconciliation burdens; preserves legacy post-trade bottlenecks.
Hybrid Model (Native + Interoperability)	Integrated (Native issuance linked to CSDs)	Connected Bridge to cash legs	Positive - Reduces issuance costs while minimising the 'new rail' penalty for investors.

Source: Siemens, 2023.

A set of complementary conditions fosters liquidity in fixed income markets, including predictable settlement finality, the ability of intermediaries to manage inventories and collateral efficiently, investor confidence in operational processes, and broad compatibility with custody and compliance infrastructures (*BIS, 2024*). Tokenisation can influence liquidity only through mechanisms that improve these conditions. One mechanism is settlement compression: shorter settlement cycles reduce counterparty exposure and can improve balance-sheet efficiency for dealers and large investors, supporting trading activity. A second mechanism is transfer and servicing efficiency. If the transfer of ownership and the servicing of coupons and corporate actions become less operationally burdensome, market-making becomes cheaper and secondary-market participation becomes less costly. A third mechanism is investor-base expansion: to the extent that tokenised issuance supports multi-currency distribution, new distribution channels, or structurally lower minimum denomination without creating new custody complexity, it can expand the set of feasible holders. None of these mechanisms operates automatically. Their effect depends on whether tokenised instruments remain operationally legible to the institutions that dominate the green bond market. If tokenisation forces a new custody stack, novel onboarding requirements, or idiosyncratic settlement arrangements that cannot be integrated into mainstream post-trade practice, the liquidity channel can be neutral or even negative because the instrument becomes "special," reducing the pool of marginal buyers and dealers.

Hong Kong's sovereign programme is therefore analytically valuable not simply because it exists, but because it provides evidence of an intent to avoid the liquidity-island outcome through repeat issuance and mainstream investor accessibility. In February 2023, the Hong Kong Monetary Authority announced the HKSAR Government's inaugural tokenised green bond offering with an issue size of HKD 800 million (*Hong Kong Monetary Authority, 2023*). In February 2024, the Government reported a successful multi-currency digital green bond offering of approximately HKD 6 billion across HKD, RMB, USD, and EUR (Hong Kong Monetary Authority, 2024). A multi-currency structure is not a cosmetic design choice; it is a direct lever on the investor-base component of liquidity because currency denomination constrains the eligible universe of institutional investors. Repeated issuance also matters because liquidity is expectation-driven: market participants become willing to invest in operational integration and to quote prices when they believe a format is repeatable and scalable rather than a one-off pilot. In greenium terms, repetition reduces novelty-related liquidity discounts and makes any preference-based premium more likely to be priced rather than offset by operational uncertainty.

The credibility channel, which is among the most pricing-sensitive dimensions in the greenium literature, cannot be treated as a side feature. Evidence indicates that "green credibility" can be a determinant of pricing differentials, implying that investors respond to governance and verification arrangements that reduce information asymmetry (*Dekker et al., 2025*). Tokenisation improves credibility only when it improves the production and integrity of evidence. A blockchain can preserve records immutably, but it cannot validate environmental reality on its own; therefore,

tokenisation must be coupled with an informational architecture that strengthens how claims are documented, versioned, and verified. In the integrated logic of Figure 1, this requirement is captured by the disclosure-data-attestation layers: disclosures must be tamper-evident and time-stamped; proceeds allocation and project performance data must be linked to reporting in a structured audit trail; and assurance responsibilities must be clearly assigned so that investors can trust the integrity of the evidence regime. Tokenisation becomes materially relevant to credibility when these layers reduce the investor's cost of verifying claims and increase confidence that reporting is disciplined rather than discretionary.

Hitachi's digitally tracked green bond architecture, as described publicly by Nomura, illustrates why credibility must be treated as a data and governance problem rather than a label problem. Nomura characterised its cooperation in issuing Hitachi's digital green bond as aiming to improve transparency and the effectiveness of gathering and providing environmental data for green investment, highlighting a Green Tracking Hub combined with a blockchain layer (*Nomura, 2023*). Interpreted through the greenium decomposition, this is best seen as an attempt to lower the credibility discount by changing the informational production function: the bond is paired with a structured evidence channel that is easier to monitor and, in principle, harder to manipulate retrospectively. The technology itself is not a guarantee of credibility; the credibility guarantee lies in the governance of data and assurance that the technology helps operationalise and make more observable to investors.

The transaction-cost channel completes the framework by linking issuer-side incentives to market-level outcomes. Tokenisation can reduce issuance and servicing costs when it substitutes away from paper-based processes and reconciliation-heavy post-trade arrangements, particularly in jurisdictions where electronic or DLT-based registers are legally recognised as authoritative. Siemens' 2023 digital bond is analytically informative because it illustrates the issuer-side narrative of operational substitution. Siemens stated that issuing the bond on a public blockchain could render paper-based global certificates and central clearing unnecessary, as associated with Germany's eWpG framework (*Siemens, 2023*). In the greenium-centred logic presented earlier, this should not be read as a claim that cost reductions automatically generate a greenium. Instead, cost reduction functions as a supply-side condition that can support market deepening by expanding the set of issuers and project pipelines for which green bond issuance becomes economically viable. As issuance becomes more repeatable and marginal costs decline, market conventions can standardise, and secondary-market functioning can improve. However, the equilibrium discipline remains strict: cost reductions are relevant for greenium formation only if they coincide with improvements in liquidity and credibility that raise investors' willingness to accept lower yields. Otherwise, efficiency gains may be captured largely on the issuer side while pricing remains unchanged because demand-side constraints persist.

This interdependence also clarifies why a hybrid technology posture is best interpreted as a coherent design solution rather than a compromise. A purely permissionless approach may maximise openness but can create institutional barriers related to identity management, regulated custody, and operational governance; conversely, a purely permissioned approach may satisfy compliance and resilience requirements yet fail to generate verifiability signals that strengthen credibility in a way that is visible and actionable for investors. The integrated architecture in Figure 1 implies a pragmatic combination: permissioned DLT for issuance, registry, onboarding, and core settlement workflows, complemented by the selective anchoring of disclosure hashes and time-stamped reporting artefacts on a public chain. This posture is consistent with policy-oriented assessments that emphasise governance, interoperability, and operating models as key constraints on tokenisation adoption (*OECD, 2024; World Economic Forum, 2025*). It is also consistent with a credibility-driven view of the greenium: if improvements in disclosure integrity become publicly verifiable without exposing confidential transaction-level information, the credibility discount can plausibly decline because investors can validate the immutability of key artefacts without relying solely on issuer assertions.

Table 2. Implementation Levers Linking Tokenisation Choices to Greenium Channels

Design Lever	Liquidity Channel (Market Microstructure &	Credibility Channel (Trust & Verification)	Friction Channel (Issuance &	Enabling Condition

	Access)		Lifecycle Costs)	
Authoritative Register Model (Native vs. Wrapper vs. Hybrid)	Native can improve transfer efficiency but risks liquidity fragmentation if isolated; hybrid reduces "new rail" penalty	Native reduces record-discrepancy risk ("dual truth"); wrapper effect is limited	Native can reduce reconciliation; wrapper preserves legacy frictions	Legal recognition of the authoritative register; enforceable investor rights
Custody and Onboarding Model (Mainstream-compatible vs. special wallets)	Mainstream custody compatibility expands feasible institutional participation	Regulated custody supports KYC/AML and operational trust	Reduces investor-side operational overhead if integrated into existing workflows	Interoperability with standard custody interfaces and asset servicing
Settlement Design (Atomic DvP vs. hybrid settlement)	Atomic DvP reduces counterparty risk and supports market-making; hybrid limits gains	Settlement finality strengthens confidence in trade completion	Reduces failures, back-office delays, and settlement frictions	Credible settlement asset for the cash leg (tokenised deposits/wholesale CBDC or equivalent)
Investor Access and Distribution (Multi-currency/global vs. narrow/local)	Multi-currency expands the eligible investor set and supports demand depth	Broader participation can signal repeatability and acceptance	Limited direct effect on per-trade cost	Instrument legibility for global portfolio systems (e.g., standard identifiers, reporting conventions)
Evidence and Reporting Architecture (Anchored disclosures + structured data vs. document-only)	Indirectly supports liquidity by providing better information for pricing and risk management systems.	Directly reduces credibility discount via a tamper-evident, auditable evidence chain.	Lowers recurring reporting and verification frictions if the data is structured	Data governance and assurance; credible verification of inputs, not just immutable storage

Sources: Zerbib, 2019; OECD, 2024; World Economic Forum, 2025).

To make the framework operational at the level of design choices, Table 2 consolidates the principal implementation levers and illustrates how each lever aligns with the liquidity, credibility, and friction channels. The table is intentionally structured around investor-relevant constraints rather than around technology features. What matters is whether a design choice reduces "new-rail" penalties, improves settlement reliability, and lowers the cost of verifying green claims. The table also highlights enabling conditions because effects are conditional. In particular, atomic delivery-versus-payment requires a credible settlement asset for the cash leg, and credibility improvements require data governance and assurance that turn disclosure into an auditable chain of evidence rather than a static set of documents (OECD, 2024).

In institutional terms, a scalable tokenised green bond format is unlikely to emerge from a single issuance. The equilibrium logic implies a phased pathway: first, the legal and operating architecture must be stabilised (authoritative register model, custody and onboarding model, and a reporting schema aligned with established green bond governance); second, an inaugural issuance must validate end-to-end processes, including settlement and assurance workflows; third, repeat issuance must be achieved to build expectations of continuity and to motivate intermediaries and investors to integrate the format into standard workflows. The market relevance of Hong Kong's programme is consistent with this logic, as it demonstrates repeat issuance and a deliberate multi-currency design that expands the eligible investor set and signals an intent to avoid liquidity islands (*Hong Kong Monetary Authority, 2023, 2024*).

In Ukraine's reconstruction context, all three greenium channels identified above become simultaneously binding constraints: liquidity is limited by investor access and post-trade interoperability, credibility is conditioned by the verifiability of allocation and impact evidence under

heightened scrutiny, and lifecycle frictions are amplified by the administrative costs of compliance and reporting for issuers and public-sector stakeholders (*UNDP, 2022*). Ukraine has established a sustainable finance policy foundation since 2021, which includes the treatment of green bonds (*National Bank of Ukraine, 2021*). At the same time, internationally documented estimates underscore the exceptional scale of reconstruction and recovery needs (*World Bank, 2024*). In such a context, investor attention to credibility and verification costs is heightened: international capital is conditioned not only on the nominal greenness of projects but on whether allocation and impact evidence can be audited efficiently and reported in an internationally legible manner. This makes tokenisation potentially valuable not as a technological modernisation project but as a mechanism for lowering the credibility discount – and, secondarily, the liquidity discount – by improving the production, integrity, and accessibility of evidence while maintaining interoperability with mainstream custody and post-trade arrangements. The baseline governance reference remains the Green Bond Principles, which specify expectations around use of proceeds, project evaluation, management of proceeds, and reporting (*International Capital Market Association, 2025*). In practical terms, a Ukraine-relevant approach is one in which tokenisation strengthens these expectations operationally: disclosures become tamper-evident and time-stamped, allocation and impact reporting are tied to structured evidence flows, and assurance responsibilities are clearly assigned so that investors can reduce verification effort without lowering standards of scrutiny.

Taken together, the continuous logic of this section is that tokenised green bonds should be evaluated as a market-design intervention whose economic relevance is mediated by greenium formation. Hong Kong anchors the liquidity and repeatability dimension through sovereign scaling and multi-currency access (*Hong Kong Monetary Authority, 2023, 2024*). Siemens illustrates the legal and cost dimensions by demonstrating how statutory recognition of electronic registers can enable operational substitution and cost reduction (*Siemens, 2023*). Hitachi illustrates the credibility dimension by highlighting a reporting and data architecture designed to make environmental evidence more observable to investors (*Nomura, 2023*). The bridge between these cases is equilibrium, not technology: liquidity, credibility, and frictions jointly determine whether investor preference becomes a priced greenium or dissipates into discounts. The hybrid posture follows directly from this mechanism because it prioritises interoperability and auditable transparency as the conditions under which tokenisation can translate into pricing power.

Conclusions. The tokenised green bonds should be evaluated as a market-design intervention whose economic relevance is mediated by greenium formation rather than by the novelty of digital issuance. A greenium-centred framework reveals that pricing outcomes depend on the joint interaction of three channels: liquidity conditions and post-trade interoperability, the credibility of green claims, and the cost of verification, as well as lifecycle frictions embedded in issuance, servicing, and reporting. The evidence from leading initiatives indicates that tokenisation creates value only when it activates these channels through institutionally robust choices, including legally recognised registers, mainstream custody compatibility, reliable settlement arrangements, and auditable disclosure and data architectures. Sovereign-scale programmes that prioritise repeat issuance and broad investor accessibility are particularly important because they reduce novelty-related liquidity discounts and anchor market expectations of scalability. For reconstruction-oriented contexts, such as Ukraine, the framework implies that tokenisation is most justified when it enhances verifiable transparency, reduces reporting burdens, and preserves interoperability with established capital-market infrastructure.

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