Carbon credit tokenisation: Pioneering a sustainable future

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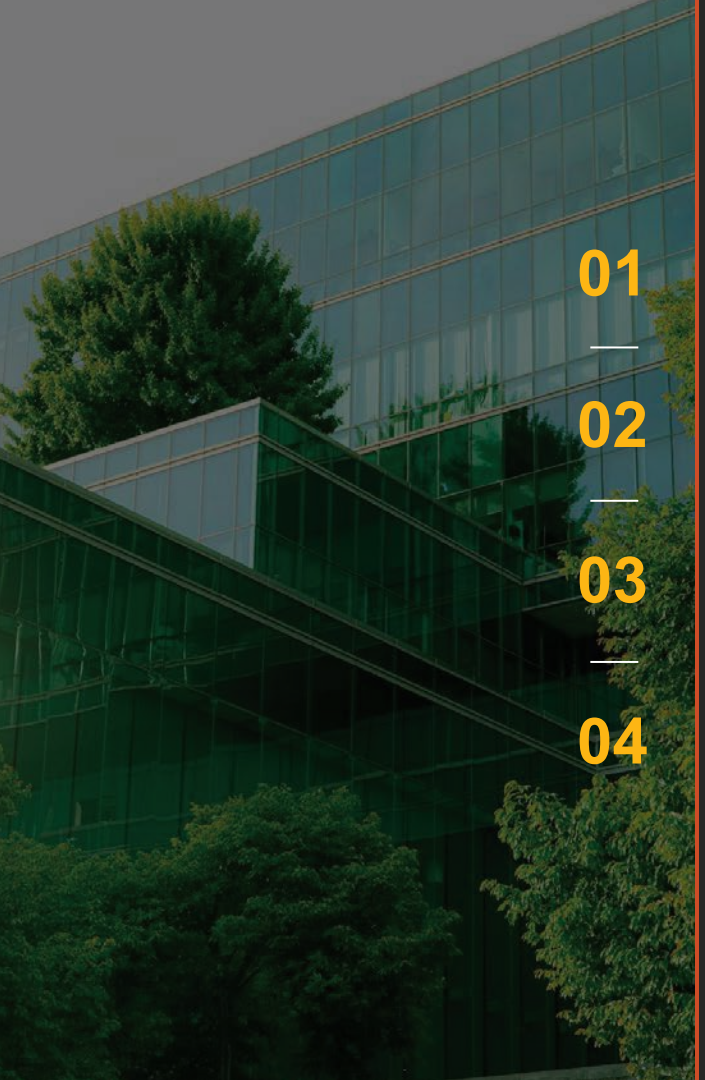


Why sustainability matters

Sustainability is pivotal to secure a livable future for ourselves and the generations to come. Our interconnected world requires us to consider our footprint on the global ecosystem. As a species, we must act as a single, interdependent entity,recognising that no asset is more precious than the planet we inhabit and its resources.

The direct relationship between sustainability and human prosperity has never been so evident and prompts us to reimagine possibilities in order to integrate sustainable considerations, preferences, and practices in our daily lives.

Indeed, sustainability must reshape our way of thinking as well as our daily practices. We are all part of a movement that requires collective action to reach global goals, such as the Paris Agreement's objective to keep the rise in global average temperature well below 2°C (3.6°F) above pre-industrial levels and to limit the increase to 1.5°C (2.7°F).

As sustainability gains momentum, individuals are changing their daily habits, preferences and consumer choices at an increasingly fast rate, with eight out of 10 consumers already making sustainability-based choices. Small organisations, large corporations and the market are acknowledging this shift and are keen to rethink their strategies to adopt sustainability practices and improve their business models.

01

Carbon credit and the role of tokenisation

What are carbon credits?

Carbon credits, also known as carbon offsets, are **permits** that allow the owner to emit a certain amount of carbon dioxide or other **greenhouse gases** (**GHGs**). One credit permits the emission of one ton of carbon dioxide or the equivalent in other GHG, becoming an universal unit of account for GHG emissions associated to a certain production process or economic activity.

Carbon credits were devised as a **mechanism to reduce greenhouse gas emissions**.

Companies get a **set number of credits, which decline over time** and they can sell any excess to other companies.

Carbon credits create a **monetary incentive for companies to reduce their carbon emissions**. Those that cannot easily reduce emissions can still operate, at a higher financial cost.

Carbon credits are based on the **cap-and-trade model** that was used to reduce sulfur pollution in the 1990s.

Negotiators at the **Glasgow COP26 climate change summit** in November 2021 agreed to create a **global carbon credit offset trading market**.

Demand for carbon credits is expected to grow significantly over the next few years, potentially leading to market solutions to manage GHG emissions

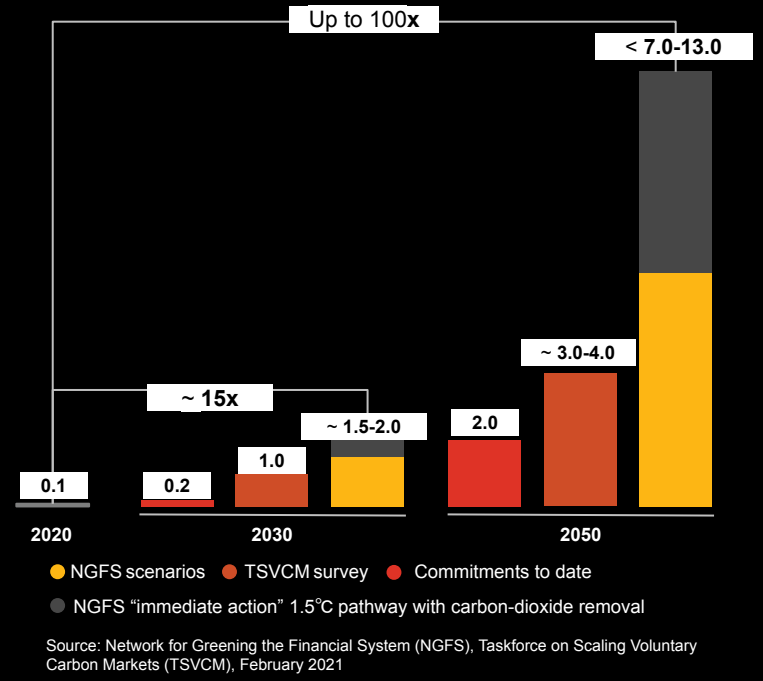
Voluntary demand scenarios for carbon credits, gigaton per year

The reflected amounts (refer image) give the assumption that all carbon dioxide removal and sequestration will result from carbon credits purchased on the voluntary market or purchased in compliance markets and carbon-offsetting projects.

The ‘commitment to date’ amounts reflect the demand that was established by climate commitments of more than 700 large companies around the world.

The Taskforce on Scaling Voluntary Carbon Markets (**TSVCM**) amounts reflect demand based on a survey of subject-matter experts in TSVCM.

The network for greening the financial system (**NGFS**) amount reflects the demand based on carbon dioxide removal and sequestration requirements under the NGFS’ 1.5˚C and 2.0˚C scenarios.



Source: Network for Greening the Financial System (NGFS), Taskforce on Scaling Voluntary Carbon Markets (TSVCM), February 2021

Carbon credits need a market to be traded in…

Given their role, **carbon credits are primed to become the "new currency" of climate action** and carbon markets will enable their efficient transfer at either global or regional level.

What are Carbon markets?

Carbon markets are trading systems in which carbon credits are sold and bought. Companies or individuals can use carbon markets to compensate for their greenhouse gas emissions by purchasing carbon credits from entities that remove or reduce greenhouse gas emissions.

Benefits

These markets are part of the answer to address the climate crisis, allowing efficient companies to **trade** their **carbon credits** with more-polluting entities that are required to **offset** their **GHG emissions**.

Challenges

Key issues with traditional carbon markets include **double-counting of GHG emission reductions and greenwashing** (in which companies falsely market their green credentials, for example, misrepresentations of climate-neutral products or services).

Types

Carbon markets may be created as a result of national, regional and/or international policy or regulatory requirements, or they may refer to the issuance, buying and selling of carbon credits on a voluntary basis.

Global and regional regulatory trends on carbon markets

Different regions around the world are implementing various strategies for carbon markets. Some are emphasising the mandatory market, while others prioritise the voluntary market, and, in certain instances, they are simultaneously exploring both avenues. These approaches are supported by a variety of regulatory measures, contributing to the increasing participation of various stakeholders in carbon markets, ultimately boosting their development.

Country/Region	Emissions trading system	Regulation	Areas addressed
European Union	EU ETS 1 EU ETS 2	Directive 2003/87/EC; Consolidated Auctioning Regulation	Established a scheme for greenhouse gas emission allowance trading
United Kingdom	UK ETS	The Greenhouse Gas Emissions Trading Scheme Order 2020; The Climate Change Act 2008 (2050 Target Amendment) Order 2019	Set a target for the year 2050 for the reduction of targeted greenhouse gas emissions and provided for a system of carbon budgeting
United States	California CaT, RGGI, Oregon ETS, and the Washington CCA	Global Warming Solutions Act of 2006; Electricity Generator Emissions Limits (310 CMR 7.74); Climate Leadership and Community Protection Act; Division 271 - Oregon Climate Protection Program; Executive Order 2019-07; Climate Commitment Act	Provided stated-led solutions to fight global warming by establishing comprehensive programs to reduce greenhouse gas emissions based on targets
Australia	Australian Carbon Credit Scheme (ACCU Scheme) The Safeguard Mechanism	Carbon Credits (Carbon Farming Initiative) Act 2011; Carbon Credits (Carbon Farming Initiative) Rule 2015	Enabled individuals and entities to earn Australian carbon credit units through a change in activities on the land to store carbon or reduce greenhouse emissions

Global and regional regulatory trends on carbon markets

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Brazil	Brazil ETS	Directive 2003/87/EC; Consolidated Auctioning Regulation	Established a scheme for greenhouse gas emission allowance trading
Saudi Arabia	Voluntary Carbon Market (VCM)	PIF and Saudi Tadawul resolution	Established the Regional Voluntary Carbon Market Company to offer guidance and resourcing to support businesses and industry in the region to transition to net zero through carbon credit purchases
United Arab Emirates	AirCarbon Exchange (ACX)v	ADGM Legal Framework	Established a Regulated Carbon Exchange and Clearing House in ADGM
Hong Kong	Core Climate	Regulatory Framework for Carbon Markets	Established an international carbon marketplace to provide transparent trading of voluntary carbon credits across Asia and to connect capital with climate-related products and opportunities
Singapore	Climate Impact X(CIX) Carbon Tax	Carbon Services and Trading Carbon Tax	Established a global marketplace, auctions house and exchange for carbon credits and a carbon tax applicable to corporates based in Singapore

Carbon credits and tokenisation in numbers

01 45% - percentage reduction in emissions by 2030 to reach net zero by 2050 as called for in the Paris Agreement

02 US$16trn by 2028. Estimated growth of asset tokenisation adoption (source: Reuters)

03 US$800bn - US$1.6trn: Estimation of the value range of the Total Addressable Market (TAM) of ESG use cases, estimated to be 5% -10% of total tokenisation adoption [1]

Source:https://blockchainlaboratories.com/ [1]

Tokenisation increases data transparency and traceability, hence it may become a suitable way of reducing GHG emission double counting and greenwashing issues

Benefits of asset tokenisation for the carbon market

Data transparency

As a financial instrument, tokens can encapsulate value and data on the blockchain, ensuring **data authenticity and transparency.**

Trading

Trading is made easier through features such as **atomic settlements and fractionalisatio**n - i.e., splitting tokens into smaller units. This increases liquidity of tokens through both primary trading (done at the time of token issuance) and secondary trading (token exchange on the secondary market).

Accessibility

The blockchain technology grants real-time data accessibility, allowing third party to monitor the market and **audit individual transactions**, which could lead to detection of greenwashing or double counting practices.

Liquidity

Tokenisation and automation led by smart contracts fosters the creation of an open, interconnected environment,hence it could lead to **reduced issuance costs, faster processing, and additional liquidity** on the carbon market.

Auditability

Tokens are traded on the blockchain, where users can take decisions based on all transactions that have occured in past. This increases the assurance the auditors can give to other users and potential investors about the **token quality and legitimacy** of the underlying tokenisation project thanks to the publication of the audit results.

Carbon credit tokenisation introduces sustainability in the virtual asset world. This will create valuable benefits for Virtual Asset Service Providers (such as token issuers and distributors) as well as for those token holders who want to reap the economic benefits of their investment while contributing to the global decarbonisation goals.

02

The role of banks in carbon credit tokenisation

Banks have a significant role to play in the emerging carbon credit tokenisation market, and acting promptly can position them as game-changing players in the virtual assets space

01

Market leadership and innovation

Being at the forefront of this innovative market demonstrates a commitment to environmental responsibility and sets a standard for others to follow.

02

Growing demand from customers

Banks that embrace Carbon Credit tokenisation early can cater to this demand, attracting a new segment of environmentally conscious clients.

03

New revenue stream (tokenised securities)

Banks can create new tokenised securities such as structured products or green bonds associated to the tokenised carbon credits, and benefit from an enhanced reputation and better branding, especially as climate-related concerns become more and more widespread.

04

Commitment to combating climate change

Banks that actively contribute to the development of carbon credit tokenisation mechanisms can align with global imperatives, demonstrating a commitment to combating climate change.

Banks can act as intermediaries, facilitators and catalysts for the effective functioning of the carbon credit tokenisation ecosystem

The banking sector can assume various pivotal responsibilities within the context of carbon credit tokenisation, including the following:

Market makers and liquidity providers

Banks have the ability to enhance liquidity inside the tokenised carbon credit market by assuming the role of market makers and fostering a resilient secondary market for tokenised carbon credits.

Custody

Banks can offer custody services for tokenised carbon credits, ensuring the safe storage and management of digital assets.

Tokenisation platform providers

Banks can develop and operate tokenisation platforms that enable the conversion of carbon credits into digital tokens on blockchain networks. These platforms facilitate the creation, issuance and management of tokenised carbon credits, ensuring transparency, traceability, and efficiency in the trading process.

Financing green projects

Banks can provide financing for projects that generate tokenised carbon credits. This involves offering loans or structured financing to support the development and implementation of environmentally friendly initiatives.

Total carbon credits market size and tokenisation share

Market size approach

The mandatory market size in 2022 [1] and related CAGR [2] are estimates based on public data available on the web.

Public sources, including Morgan Stanley [3], have been leveraged to assess the voluntary market size of carbon credit at US$2bn in 2022, while Morgan Stanley projects it as US$100bn in 2030.

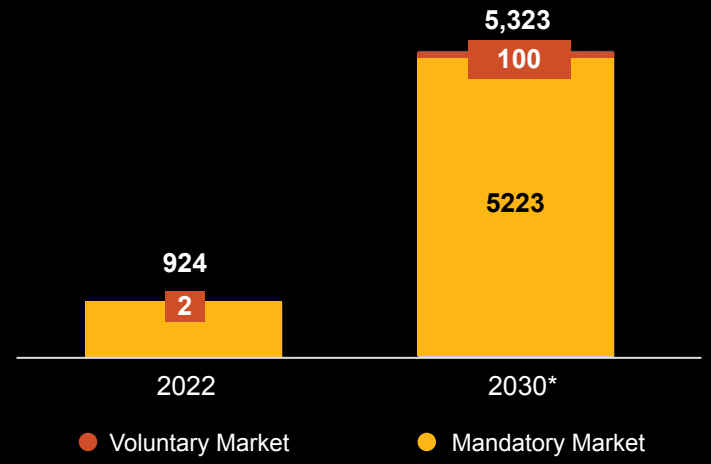
[1] Refinitiv, Carbon Market Year in Review, 2022.
[2] Coherent Market Insights, Global Carbon Credit Market Size and Share Analysis.
[3] Morgan Stanley, Where the Carbon Offset Market Is Poised to Surge, April 2023.

Data transparency

In 2022, the global carbon market saw a notable 13.5% increase in value, reaching a record-high of $922 billion. This substantial growth was primarily driven by an increased demand for carbon permits, resulting in a significant surge in prices. It also underscores the global commitment to achieving net-zero emissions and the increased investments in carbon capture technologies. The European Union Emissions Trading System (EU ETS) claimed the majority of this market, comprising approximately 87% of the total global mandatory market size in 2022, amounting to $802 billion. Coherent market Insights has estimated that the mandatory carbon market will exhibit a compound annual growth rate (CAGR) of 24.4% from 2022 to 2030.

Voluntary Market

The demand for voluntary carbon credits is expected to increase as global efforts to reduce carbon emissions intensify. By 2030, the annual global demand for carbon credits is estimated to range from 1.5 to 2.0 gigatons of carbon dioxide (GtCO2) and reach as high as 7 to 13 GtCO2 by 2050, in line with the 1.5-degree warming goal. According to Morgan Stanley, the market is anticipated to expand from $2 billion to reach approximately $100 billion by 2030 and could potentially reach around $250 billion by 2050



Key insights on carbon credits tokenisation

Sample exchange platforms related to the tokenisation of carbon credits and carbon credit trading:

- Toucan Protocol
- ACX
- MOSS
- Carbon Credit (CCT)
- Climate Impact X (CIX)
- Bitmo Platform
- Flowcarbon
- CarbonEco
- JustCarbon

Tokenised carbon credits

- The **Toucan Protocol** has **tokenised 20 million of carbon credits,** involving more than 50 climate projects [1].
- Furthermore, **ACX tokenised** about **3.8 million of tCO2e (2022),** having a total trading turnover of $ 21.2 million over the period 2021-2022 [2].
- By 2022, Moss Earth had issued more than **2.8 million** of **Moss Carbon Credit** (MCO2) tokens [3].

[1] Toucan - Our History.
[2] International Review of Economics & Finance - Trading carbon credit tokens on the blockchain, March 2024.
[3] The Wall Street Journal - Carbon-Credit Registry Proposes Rules for Crypto Tokens, August 2022.

03

Opportunities for banks

Banks and tokenised carbon credits: A new set of game changing opportunities

Banks can become one of the major catalysts for the expansion of carbon credits markets

Ecosystem creation

Banks have the opportunity to create an ecosystem offering their clients and partners wishing to offset their carbon exposure with an access to a secure and user-friendly marketplace. The marketplace would provide the capability to efficiently evaluate, buy, exchange and redeem carbon credits.

Opportunities for banks

Banks can capture ESG opportunities and remain aligned with the different commitments taken by their respective boards. They can also strengthen the relationships with their key clients who also need to reach their own ESG targets.

Network effect

Banks can create a network effect by building consortiums or partnerships with other banks as well as other companies wishing to be actively involved in the ESG space. The growth of the ecosystem would also further support the supply of quality projects.

Banks and tokenised carbon credits: A new set of game changing opportunities

Banks can become one of the major catalysts for the expansion of carbon credits markets

Product innovation

Carbon credit tokenisation offers the opportunity for banks to create hybrid financial products such as carbon baskets, tokenised structured products and green bonds.
Powered by DLTand smart contracts, those new products would be more accessible and offer a more seamless process for issuers as well as increased portfolio diversification to clients.

Price discovery

The OTC bulletin board and/or order books available for clients to trade on the primary and secondary market will improve access to liquidity and generate a better and more transparent price discovery mechanism.

Increase trust

Banks act as a facilitator by sourcing trustworthy and quality carbon credits projects before tokenising new tokens and listing them on the platform. Clients can trust the bank for performing due diligences on multiple projects which ultimately reduces the risk of greenwashing.

Carbon credit tokenisation is changing market dynamics…

As key enablers, banks supporting the launch of tokenised carbon credits marketplaces would offer multiple benefits to issuers and investors

Benefits for issuers

- Access to a wider network of buyers and create new strategic and business opportunities with banks and corporates
- Enhanced reputation through the affiliation to a regulated and secure ecosystem managed by financial institutions
- Directly connecting tokenized carbon credit owners and issuers becomes easier thanks to the increased traceability offered by DLT
- Increase traceability and auditing capabilities of issued carbon credits through the use of DLT
- Increase operational efficiency and reduce the need for dealing with unnecessary intermediaries
- Faster access to funding while reducing risk given increased efficiency

Benefits for investors

- Access to a secure primary/secondary marketplace where counterparts issuers and investors are known (KYC)
- Select high quality carbon credits registered on the major carbon registries
- Avoid navigating on opaque carbon credits ecosystem and rely on enterprise grade platforms using secure and advanced technology
- Drastically reduce operational frictions with registry management, lengthy due diligences and legal reviews
- Access carbon credits markets within a regulated environment
- Smart contract powered atomic settlement offer a near real time settlement

The process for carbon credits tokenisation is based on key components such as the token issuance and its distribution, custody and trading

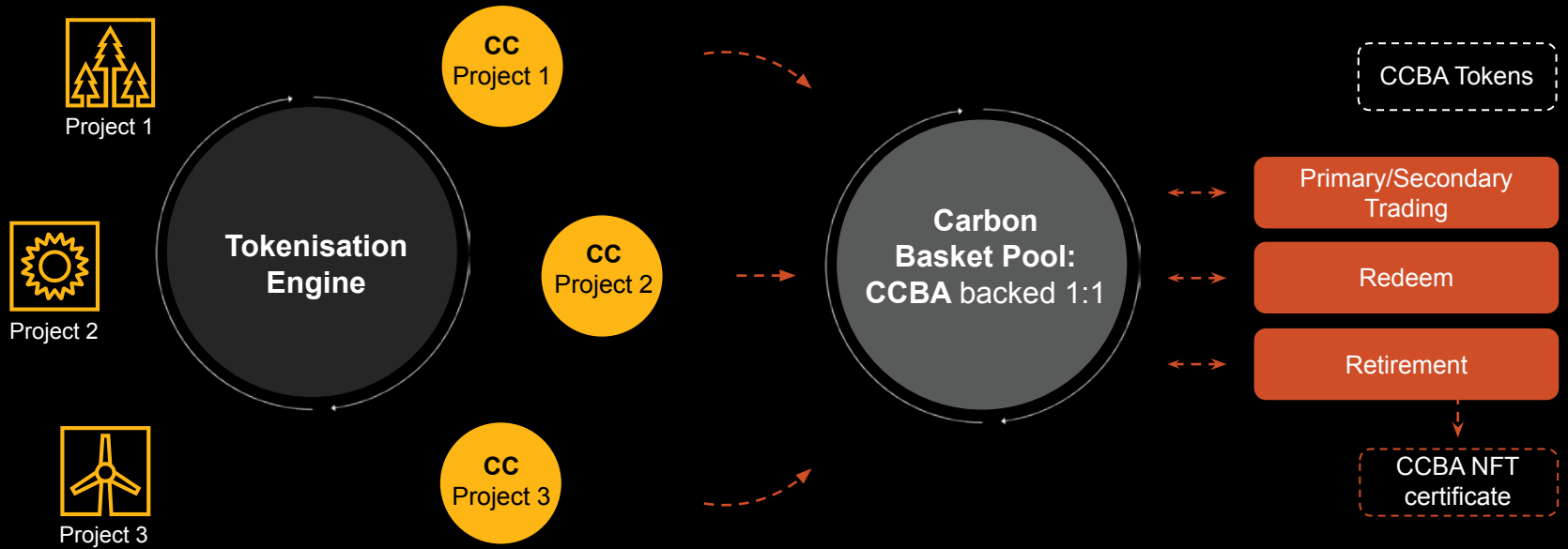
Carbon credit tokenisation lifecycle

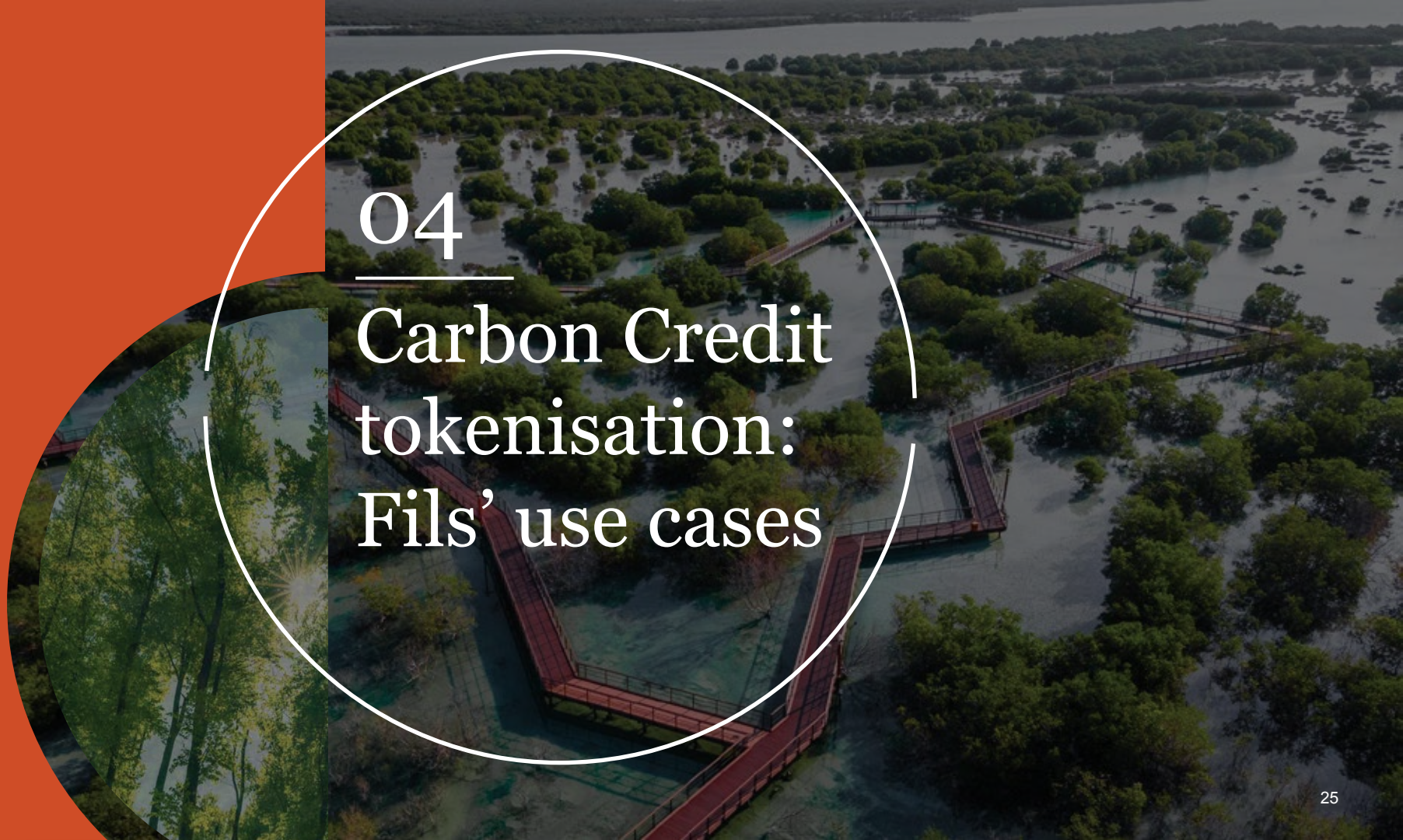
Registration and issuance	Distribution and storage	Trading	Termination
Registration Carbon credits verification and registration through registries e.g.Gold Standard or Verra **Issuance** Carbon credit token smart contract design and token minting	**Distribution** Tokens are directly distributed to the owner **Storage** Online or offline self storage by owner or storage with third party custodian	**Trading** Primary and secondary market trading through bulletin board or exchange order books	**Redemption or retirement** Redemption or retirement of the carbon credits tokens followed with the issuance of NFT certificates
Registration The **carbon credit owner** needs to have the Carbon Credit verified by a recognised **carbon credits registry**. **Issuance (tokenisation)** The **token issuer** (for example, a financial institution who owns the carbon credits, or manages them on behalf of the original owner) designs the carbon credits smart contract as per the carbon credits details (such as volume, year, location, etc.) before tokens are minted on chain.	**Distribution** Once tokens are minted on-chain, they are directly distributed to the owner. **Storage** Tokens also require to be securely stored and protected. In this regard, Token Issuers have access to multiple **VA custody solutions**, to ensure their tokens are safe (built-in solutions or through VA third-party Custodians).	**Trading** Tokens are transferred and traded on a proprietary or third-party platform (**VA marketplace**). Token issuers have the option to distribute their tokens in the secondary market through Virtual Asset (VA) Exchanges, which can be either centralised or decentralised, or through broker-dealers. The choice among these platforms depends on the issuers' specific requirements and the characteristics of the assets.	**Termination** Tokens are redeemed or retired **by token investors** depending on how they decide to manage their emission reductions and remove their tokenised carbon credits from the marketplace.

New perspective: Tokenised carbon credit baskets

1 Carbon credits units are minted on-chain (Non-Fungible Token)

2 CC tokenised carbon credits with similar attributes are placed and locked within the basket pool smart contract where CCBA non-fungible tokens are minted





04

Carbon Credit tokenisation: Fils' use cases

Fils: Sustainability and carbon markets Fintech use cases

Product:

Fils enterprise-grade digital infrastructure enables businesses of all sizes to embed sustainable and climate action into their business models and customer journeys, across industries.

API
Enabling emission calculations through the APIs that are platform and industry agnostic.

Science
Science based calculations for various industries and product development.

Carbon markets
Marketplace for carbon credits sourced from leading registries and regulated suppliers bulk and fractionalized offsets.

Blockchain
- Fils on chain ledger: Crucial role in tracking carbon offset purchases and their subsequent allocations.
- Fils' wallets are integrated with the Sui blockchain, allowing for secure and efficient transactions.
- Fils, the use of Non-Fungible Tokens (NFTs) represents an innovative approach to carbon offset certification and tracking ensuring that each certificate can be distinctly recognized and verified.

Use cases – Banking (retail) acquiring:

Magnati, E&(Formerly Etisalat), Geidea, Arab Financial Services, TELR, TPS, CashIn

Sustainable merchant services:
Acquiring banks are enabled offer merchants the ability to accept payments that automatically calculate and offset carbon emissions. Tokenised carbon credits are integrated into payment processing, enabling merchants to contribute to sustainability efforts seamlessly.

Transparent reporting for businesses:
Merchants benefit from precise, blockchain-enabled reporting on the carbon impact of their sales. This data can be used for sustainability reports their green credentials and customer trust.

Enhanced customer loyalty programmes:
Enable merchants to offer customers rewards in the form of tokenised carbon credits. Fosters customer loyalty and encouraging environmentally conscious purchasing decisions.

Fils: Sustainability and carbon markets Fintech use cases

Issuance:
Arab Financial Services, TPS, AION, and Codebase Technologies.

01

Eco-rewards for banking activities:
Tokenisation allows banks to offer carbon credits as rewards for specific customer activities. This could include incentives for maintaining account balances or for using debit and credit cards, turning everyday banking into opportunities for customers to contribute to environmental sustainability.

02

Green financial products:
Retail banks can create green investment products or offer lower interest rates on eco-friendly loans, providing tokenized carbon credits as bonuses or rebates. This encourages customers to make environmentally beneficial choices, like investing in renewable energy or purchasing energy-efficient appliances.

03

Personal carbon footprint management:
Banks can integrate tokenised carbon credits into their digital platforms, enabling customers to track and offset their carbon footprint directly through their banking app. This not only promotes transparency but also empowers customers to take part in global sustainability efforts actively.

Fils: Sustainability and carbon markets Fintech use cases

Use Cases – Banking (Corporate):
Leading UAE, Pakistan and GCC Banks

01

Transaction banking offering:
Fils leverages advanced analytics to provide emission calculations for corporate transactions, integrating seamlessly with corporate banking platforms and offering insights into the carbon footprint associated with corporate spend. This service utilises a subscription and transaction fee model, enriched with premium services for deeper analytics and personalised sustainability strategies.

02

Green or carbon neutral real estate loan:
Fils takes a groundbreaking approach to financing, where a portion of the fees and interest margins are allocated towards carbon offset projects. This initiative extends to both individual homebuyers and property developers, providing scalable solutions for offsetting the carbon footprint of real estate projects.

03

Partnerships: *R - Regulated:
1. E& Enterprise
2. Magnati (R)
3. GEIDEA ®
4. Mashreq Bank (R)
5. SUI Blockchain
6. TELR
7. AFS (R)
8. Cashin (R)
9. TPS
10. ACX (R)

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