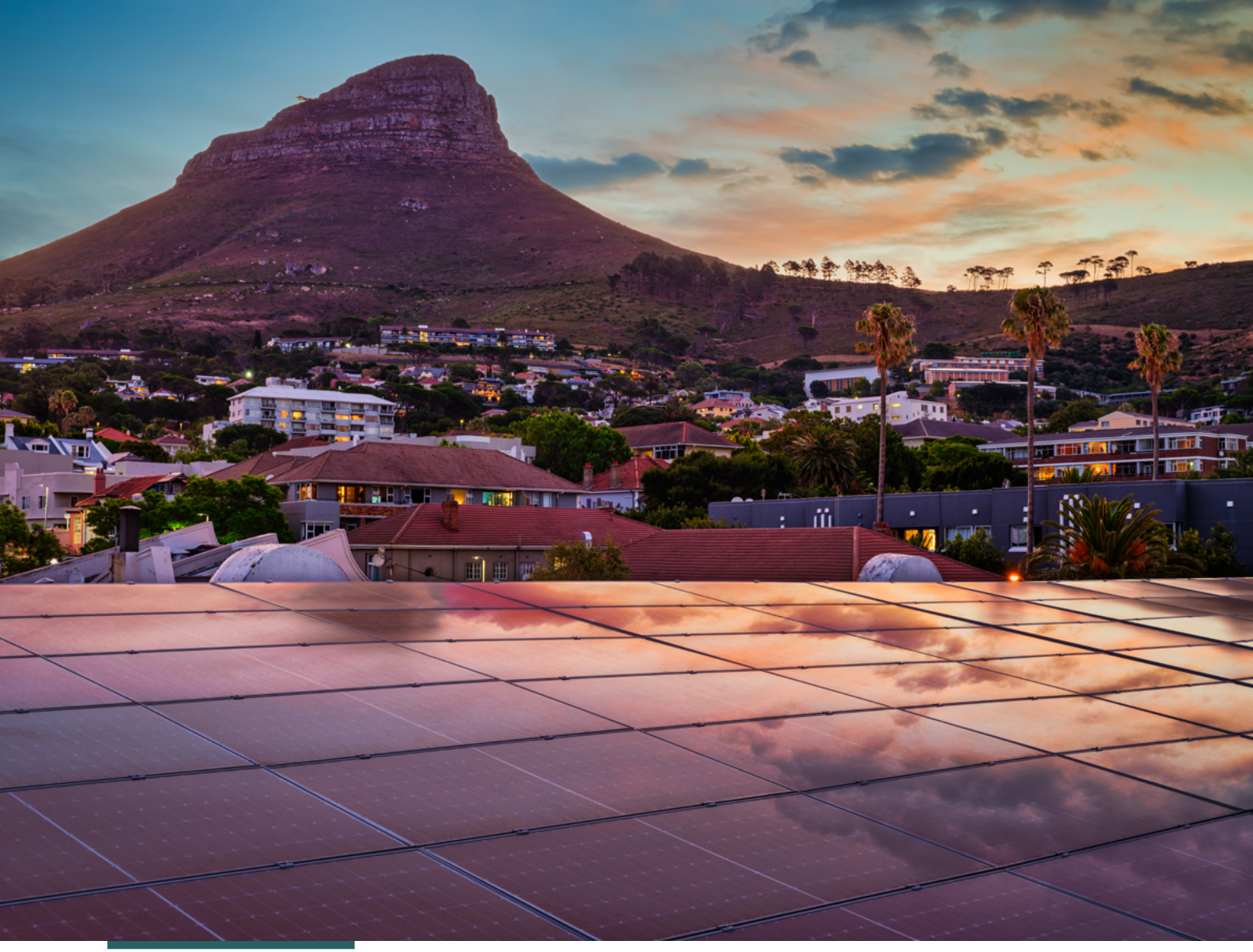

DBSA: Financial instrument design for an effective carbon market in South Africa

Instrument Design Report

FiCS LAB

CLIMATE POLICY INITIATIVE

DBSA

PROMETHIUM CARBON

Pm

AUTHORS

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I. SUMMARY

A. INSTRUMENT PURPOSE

Through the FiCS Innovation Lab, the Development Bank of Southern Africa (DBSA) has developed a potential approach to better support the development of South Africa's voluntary carbon market (VCM). The proposed instruments aim to address the demand-supply imbalance in South Africa's carbon ecosystem, resulting from limited early-stage financing, high cost of capital, and thin secondary market liquidity.

A carbon repurchase (repo) facility and a carbon bond instrument underpin the approach developed by DBSA with support from Climate Policy Initiative (CPI) and Promethium Carbon. These instruments are now pending review and approval by the DBSA board.

Together, the instruments are designed to transform carbon credits from bespoke, high-friction assets into investable, de-risked products that align with the needs of mainstream financial institutions in South Africa. They are structured as follows:

- **The Bond** could be issued by DBSA as a senior unsecured note to raise capital for deployment as business loans to carbon projects. These loans would be repaid through a combination of cash interest and carbon credits generated by the underlying projects.
- **The Carbon Repo Facility** would offer short- to medium-term financing secured against issued carbon credits. Borrowers would sell carbon credits to the facility and agree to repurchase them later at a higher price.

This report presents one of the three novel climate finance instruments developed by PDBs through the FiCS Innovation Lab between 2025 and 2026. The instruments were designed to address key barriers to scaling climate finance in emerging markets, combining financial innovation with technical support and institutional capacity building.

"The financial instruments that are developed with the FiCS funding address some of the key risks that banks face when participating in the local carbon markets. An added benefit is that funding from these instruments will be deployed into carbon projects, ensuring that there is a steady supply of carbon credits in the market."

– DBSA

B. CORE PROBLEM ADDRESSED

Demand for carbon credits is projected to far outstrip supply in South Africa's carbon market, with great potential to build more bankable carbon projects through market-based mechanisms. However, carbon projects often struggle to secure early-stage capital before validation or registration.

As a development finance institution (DFI), DBSA is well-positioned to support financing for carbon-related projects. The bank is mandated to finance and catalyze infrastructure-led development that advances sustainable economic growth and increasingly supports the region's low-carbon, climate-resilient transition. In the context of carbon markets, this mandate positions DBSA as a key intermediary for blending and mobilizing public and private climate finance, enabling the development of bankable mitigation projects and facilitating the generation and monetization of carbon credits aligned with national climate priorities.

C. KEY INSIGHTS

- South Africa is expected to see an increase in structural demand for carbon credits as its carbon tax tightens. However, a lack of early-stage capital for carbon projects limits supply.
- In addition, illiquidity and weak pricing in secondary markets reduce the attractiveness of carbon credits as financial assets.
- PDBs can enable carbon markets by introducing well-structured financial instruments that mobilize private financing from commercial banks into carbon projects.
- Market credibility is a prerequisite for mobilizing capital into carbon markets at scale. Trust in carbon-linked instruments requires robust governance and registry transparency, underpinned by independent verification.

D. SUMMARY OF DESIGN PRINCIPLES

- **Innovative:** If approved by DBSA, this will be the first carbon credit-linked bond to be issued in South Africa.
- **Actionable:** The initiative translates conceptual frameworks into practice by specifying how the bank will structure, manage, and deploy the instruments within its existing mandates and systems.
- **Replicable:** The proposed approach can be replicated in other contexts where there is regulatory readiness, proactive DFI involvement, localized market insights, and partnerships structured around regional needs and capacities.
- **Catalytic:** The initiative will de-risk and mobilize private investment through robust carbon market development while delivering co-benefits in climate resilience, economic inclusion, and measurable emissions mitigation.

II. CONTEXT

South Africa's early carbon market activities were directed by international demand. The country's engagement began in the mid-2000s via the Clean Development Mechanism under the Kyoto Protocol. Projects supplied credits largely to the European Union Emission Trading System. However, demand fell sharply after 2012, when the EU restricted the use of international offsets to those from least developed countries, effectively excluding South African credits.

A major turning point for the domestic carbon market was the introduction of South Africa's national carbon tax in 2019, which created structured demand for carbon offsets. The tax applies to direct emissions that exceed thresholds outlined in the Act, from listed activities including fossil fuel combustion, industrial processes, and fugitive emissions. The Act allowed companies to use certified carbon credits to offset up to 5-10% of their taxable emissions. Under Phase 2 (2026-2030), the carbon offset allowance will increase by five percentage points, allowing trading of up to 15% for combustion emissions and up to 10% for industrial processes and fugitive emissions. This change signals an increase in companies' compliance-linked demand for credits.

In parallel, South Africa's carbon market infrastructure is evolving. The Johannesburg Stock Exchange (JSE) Ventures Voluntary Carbon Market Initiative launched in 2023, with the aim of improving price discovery, liquidity, transparency and participation for carbon credits by connecting sellers to a wider pool of buyers, including corporates.

International mechanisms also signal growing external markets. These include the Carbon Offsetting and Reduction Scheme for International Aviation and the International Maritime Organization's carbon pricing system, though these frameworks are not yet driving significant demand for South Africa's carbon credits.

A. THE CHALLENGE

1. SUPPLY-DEMAND GAP IN SOUTH AFRICA'S CARBON MARKET

In South Africa's first carbon tax compliance cycle (2020), demand was roughly three times higher than the supply of credits as companies rushed to procure offsets. Compliance-linked demand will likely continue to increase with Phase 2 of carbon tax implementation from 2026.

The supply imbalance is due to a financing gap for developers. Carbon-credit project owners, especially SMEs or those in land-based sectors, are unable to attract debt or structured equity until third-party guarantees, offtake contracts, or certified credit streams have been secured.

Long development lead times, uncertain timelines, and high validation and verification costs make the high-risk, pre-issuance phases of carbon projects unattractive to financial institutions. As a result, potentially bankable projects stall before validation or registration, reinforcing a cycle of limited credit supply and low liquidity in the VCM.

There is also a mismatch in pricing expectations. Investors typically prefer floating-rate instruments to hedge against inflation and interest rate risk, while many carbon projects have fixed or uncertain revenue streams tied to credit issuance and pricing.

2. THIN SECONDARY MARKET LIQUIDITY FOR VOLUNTARY CARBON CREDITS

In addition, South Africa lacks foundational market infrastructure to support price formation, trade execution, and credit tracking of carbon projects. Carbon credits remain a non-standard, illiquid asset class that does not align with banks' internal systems or risk frameworks.

The secondary market for carbon credits is thin and opaque, and banks have limited ability to exit positions. This discourages warehousing strategies and undermines the creation of structured products. There is also currently no exchange-listed or standardized carbon product in South Africa that banks can use for hedging, trading, or price referencing, creating price discovery challenges.

To scale within institutional portfolios, carbon credit-backed instruments must be structured to approximate high-quality liquid assets (HQLA). With this classification, banks could use these instruments for capital requirements and could be incentivized to hold such instruments.

Additionally, the risk-return profile of carbon credits does not align with traditional debt market expectations. Debt markets are inherently low-risk and require predictable cash flows, while carbon credit generation is subject to project execution risk, verification and issuance uncertainty, and price volatility in secondary markets. As a result, substantial risk mitigation mechanisms (e.g., guarantees, insurance, over-collateralization, or offtake agreements) are required to make carbon-backed instruments bankable.

3. LACK OF REGULATORY CLARITY AND STANDARDS TO ENSURE HIGH-INTEGRITY CARBON CREDITS

Carbon credits are not yet formally classified under the South African Financial Markets Act (FMA), creating a fundamental barrier to integrating them into mainstream capital markets. This regulatory gap limits the ability to structure and list carbon credit-backed instruments (e.g., bonds or notes) on exchanges, constraining access to institutional capital and reducing pathways to scaling project financing. In the absence of clear classification, carbon credit-backed financing structures are largely restricted to private placements, which significantly limits investor participation and restricts access to a liquid secondary market. This further reinforces the illiquidity challenges in the broader carbon market and reduces the attractiveness of carbon-linked instruments for institutional investors.

Concerns around greenwashing, non-permanence, and over-crediting, especially in high-profile international cases, have affected perceptions of VCMs. Financial institutions face pressure to engage only when credits are backed by robust verification, recognized standards, and clear environmental integrity. Investors are increasingly concerned about reputational risks that might arise from financing low-integrity carbon projects amid growing global scrutiny following some high-profile international controversies.

Finally, while South Africa has a registry for tax offset credits within the Carbon Offset Administration System, there is no national standard governing voluntary carbon credit integrity. The absence of accredited local verifiers further limits the market's ability to scale. Without a pathway to develop and certify domestic monitoring, reporting, and verification (MRV), as well as auditing capacity, aligned with recognized standards, local developers and service providers are constrained from meaningful market participation.

B. THE SOLUTION

DBSA is a key intermediary for blending and mobilizing climate finance, enabling the development of bankable mitigation projects and facilitating the generation and monetization of carbon credits aligned with national climate priorities. The bank's activities are closely aligned with South Africa's Nationally Determined Contributions and those of the broader Southern Africa region through investments that promote sustainable infrastructure, regional integration, and inclusive green growth. It also supports the achievement of the UN Sustainable Development Goals (SDGs) and contributes to the African Union's Agenda 2063. The bank is committed to increasing climate financing in the Southern Africa region and has raised more than USD 525 million in funding from the Green Climate Fund**.**

DBSA is exploring new sustainable finance streams and regards voluntary carbon markets as playing a critical role. In addition, the bank has established a dedicated internal Climate Environment Finance Unit as well as an Environment, Social and Governance (ESG) Unit and hopes to develop an aligned Carbon Finance unit and capability anchored by the voluntary carbon market.

In partnership with CPI and Promethium Carbon, DBSA undertook a study to consider measures that may shape a supportive business environment for implementing an effective carbon market in South Africa. As a result, DBSA has supported the development of two carbon-linked financial instruments to address existing market failures and unlock private capital at scale, which may be implemented after DBSA board approval. The two incubated instruments are:

i. A Bond that may be issued by DBSA, enabling long-tenor, climate-yielding project finance.

ii. A Carbon Repo Facility to provide liquidity, price stability, and working capital access to carbon project developers as well as risk reduction for commercial banks, with a guarantee from DBSA.

III. INSTRUMENT STRUCTURE AND STRATEGY

A. INSTRUMENT INTRODUCTION

The Bond and Carbon Repo Facility are designed to support the transformation of carbon credits from bespoke, high-friction assets into investable, de-risked financial instruments that align with the requirements of mainstream capital markets. The instruments have been designed to overcome the structural and regulatory limitations discussed in Section II A.

1. **The Carbon Credit-Backed Bond**, potentially named as a sustainability-linked bond to align with the current FMA classification, would be issued by DBSA as a senior unsecured note, aligned with the International Capital Market Association (ICMA) Green Bond Principles (2025). The capital raised is intended to be deployed into carbon projects through business loans, which would be repaid through a combination of cash interest and carbon credits generated by the underlying projects.
2. **The Carbon Repo Facility** (sell/buy-back facility) would provide short- to medium-term finance secured against issued carbon credits, where borrowers sell carbon credits today and agree to repurchase them at a higher price on a later date (e.g., in 12 months). This mechanism could be used by project developers to temporarily convert carbon credits into working capital, or by commercial banks to offload carbon credits to reduce their capital adequacy ratio. Importantly, the carbon credits change legal ownership to the buyer, temporarily removing them from the balance sheet of the original owner.

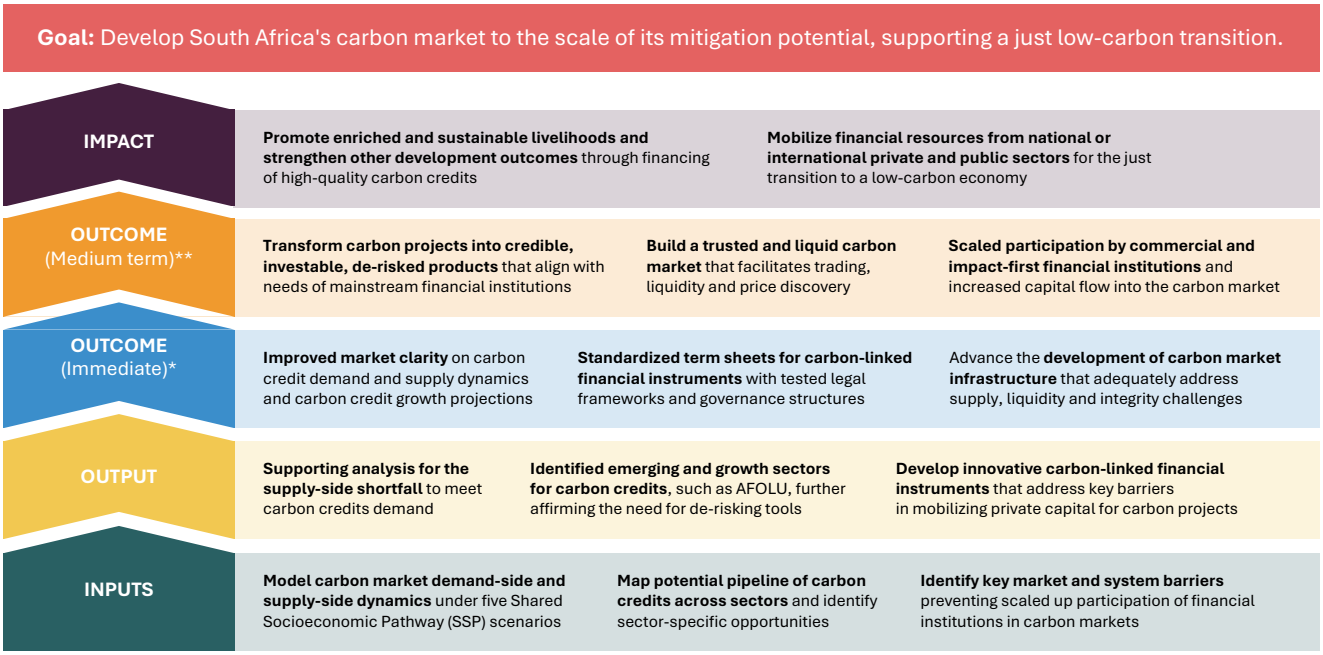
B. THEORY OF CHANGE

The two financial instruments being explored for pilot aim to develop South Africa's carbon market to meet its full mitigation potential, in support of the country's just transition to a low-carbon economy. Supply-side potential exists across waste, energy, and nature-based sectors, but credit generation is constrained by limited early-stage finance, weak institutional capacity, and the absence of a national registry aligned with international systems.

The two instruments aim to provide finance for carbon projects, foster a trusted and liquid carbon market, and encourage participation by commercial and institutional investors over time.

Ultimately, the market insights yielded by the modeling for this instrument design and the piloting of the two financial instruments can mobilize financial resources from national and international private and public sectors for the just transition, as well as promote sustainable livelihoods and strengthen other development outcomes through high-quality carbon credits (see Figure 1).

Figure 1. Theory of Change



*within 3-5 years
**post 5 years

C. INSTRUMENT MECHANICS

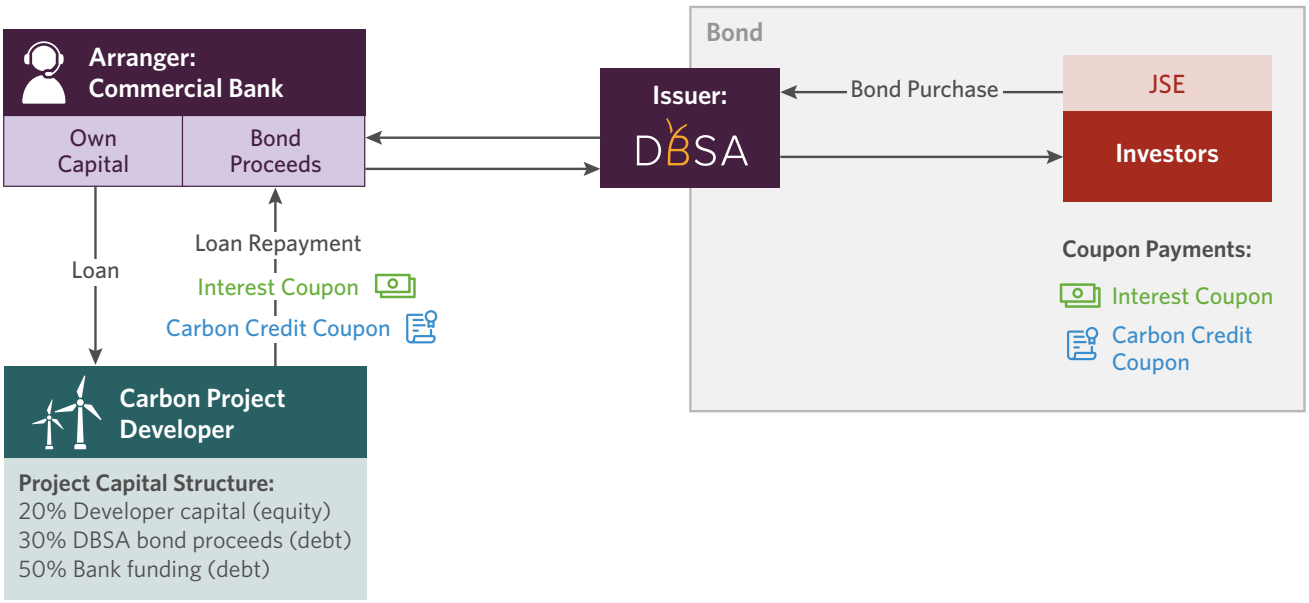
The Promethium Carbon and CPI teams laid out five potential instruments for DBSA, of which the carbon bond and repo facility were chosen due to their complementarity with current DBSA efforts.

CARBON CREDIT-BACKED BOND

1. **The Bond** is proposed to be issued as a senior unsecured note by DBSA to fund business loans for carbon projects.
2. **Its proceeds** would be deployed through on-lending and co-investment facilities with participating commercial banks and other financial intermediaries, which will originate and finance eligible carbon-yielding projects in accordance with DBSA's Green Bond Framework. The bank would contribute one-third of the debt allocation, and the intermediaries two-thirds, ensuring that the bond proceeds leverage private capital.
3. **Bond repayment:** Investors would receive their interest coupon fully in cash. In addition, they would receive a carbon-linked coupon, also in cash, following the issuer's sale of the carbon credits received from project developers into the carbon market.
4. **Bond governance** would be by DBSA's Green Bond Framework, which sets out the Issuer's approach to alignment with the ICMA Green Bond Principles (2025).
5. **Reporting:** DBSA would prepare and publish an annual report detailing the allocation of proceeds and the environmental and social impact of financed projects, in accordance with the ICMA Green Bond Principles and the JSE Green Bond Segment disclosure requirements. Participating commercial banks would submit to the DBSA verified allocation

and impact data for all projects financed under the on- lending and co-investment facilities. Such information would include disbursement amounts, project implementation status, verified carbon credit issuances, and key environmental and social performance indicators, supported by independent verification where applicable.

Figure 2. Visualization of the Carbon Credit-Backed Bond



CARBON REPO FACILITY

There are two use cases for the Carbon Repo Facility, with two different actor groups selling and later buying carbon credits. In both cases, the DBSA would take the repo interest as revenue.

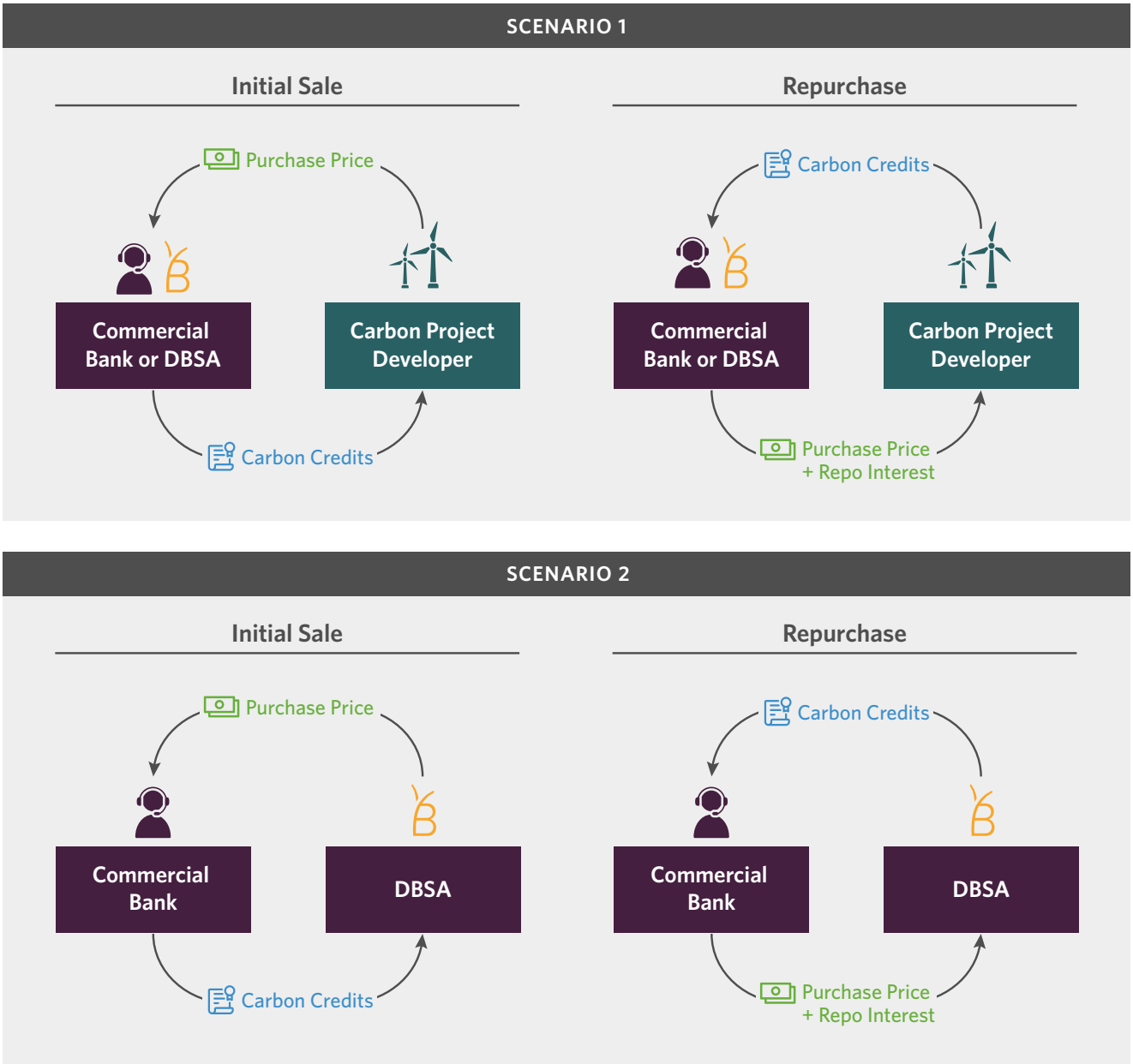
SCENARIO 1: PROJECT DEVELOPERS

A developer who has already-issued carbon credits on its balance sheet with a commitment from a third party to purchase them (e.g., in the following year), could make use of the Carbon Repo Facility to obtain working capital in the immediate term. The developer would sell the credits to the facility (spot or forward) in return for cash. Legal ownership of the carbon credits would transfer from the developer to the financier. On a future date (e.g., in 12 months), the developer would buy the credits back at a pre-agreed price, regaining legal ownership of the credits, ready to meet its obligation in the carbon tax market. If the project developer were to default, the financier would liquidate the credits on the carbon market.

SCENARIO 2: COMMERCIAL BANKS

A commercial bank with already-issued carbon credits on its balance sheet could access the Carbon Repo Facility to fulfill a Basel III capital adequacy ratio (CAR) requirement to hold capital corresponding to 60% of its value. Temporarily reducing the bank's CAR requires capital reserves. The bank could sell its credits to DBSA as a spot or forward contract in exchange for cash. Legal ownership of the carbon credits would transfer from the commercial bank to DBSA. On a future date, the commercial bank would repurchase the credits at a pre-agreed price and regain legal ownership of the credits.

Figure 3. Visualizations of Carbon Repo Facility



IV. INCUBATION AND IMPLEMENTATION

A. ROLES AND RESPONSIBILITIES

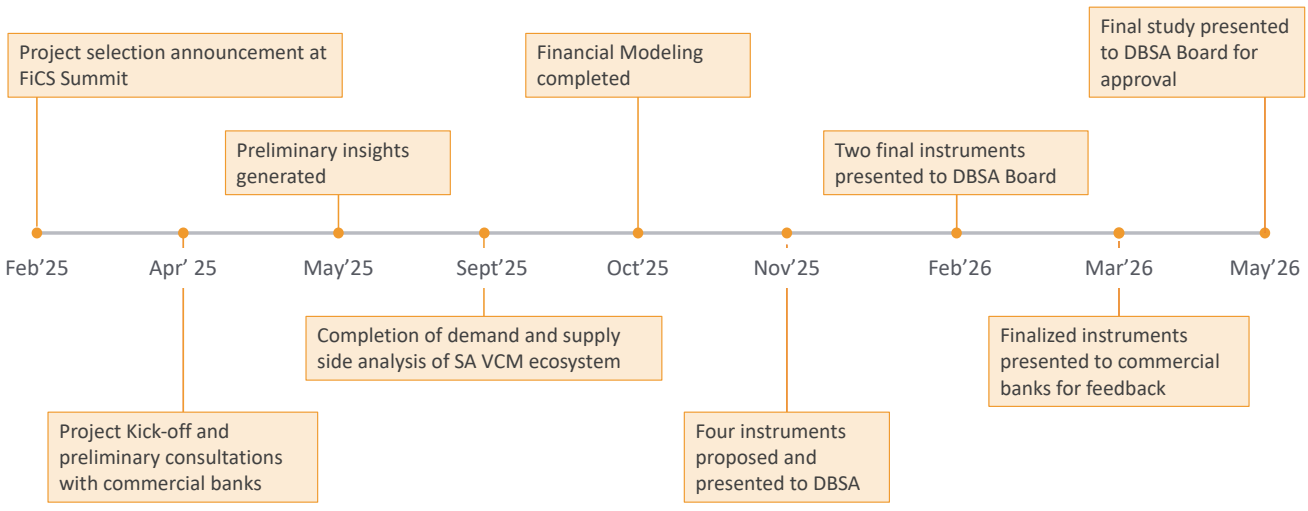
Figure 4 highlights the roles in the incubation process of DBSA, CPI, and Promethium Carbon.

Figure 4. Stakeholder Roles in the Incubation Process

Stakeholder	Core roles	Key contributions
DBSA	PDB leading the initiative	▪ Instrument proponent ▪ Solution co-development ▪ Lead stakeholder engagement ▪ Strategic direction
CLIMATE POLICY INITIATIVE	Strategic support and project coordination	▪ Demand side analysis of South Africa's VCM ecosystem ▪ Technical analysis and validation of deliverables ▪ Stress testing and quality control
PROMETHIUM CARBON	Technical lead for design and delivery	▪ Supply-side analysis of South Africa's VCM ecosystem ▪ Financial modeling of the instrument ▪ Environment and social modeling for instrument impact ▪ Pathway development and capital mapping

Figure 5 highlights the key milestones in the incubation process, with the final study due to be presented to the DBSA board for approval.

Figure 5. Instrument Development Process



B. INCUBATION PATHWAY

The instruments were designed using an iterative and evidence-based process involving financial analysis, instrument structuring, and stakeholder engagement. The incubation process evolved through four key milestones:

1. Preliminary stakeholder engagement with commercial banks and other actors
2. Preliminary analysis of the existing VCM ecosystem
3. Modeling of South Africa's carbon credit supply and demand through 2035
4. Financial modeling to inform instrument design

1. STAKEHOLDER ENGAGEMENT

Initial consultations with several major financial institutions in South Africa focused on identifying how they could participate across the carbon market value chain. This included exploring potential roles in trading, such as acting as aggregators, brokers, or market makers; sourcing, including facilitating project origination or supporting offtake agreements; and financial intermediation through the development of innovative financial products that could help mobilize capital into carbon projects.

Consulted institutions included Standard Bank, Nedbank, Rand Merchant Bank, Investec, Absa, and the Industrial Development Corporation. The discussions provided insights into market barriers, risk perceptions, institutional capabilities, and the types of financial instruments that could enable banks to engage in the VCM ecosystem.

2. VCM ECOSYSTEM ANALYSIS

A comprehensive desk-based assessment of South Africa's VCM ecosystem evaluated the country's carbon market infrastructure, key market participants, and regulatory landscape. It also explored the key challenges and opportunities for scaling both carbon credit supply and demand.

The analysis was grounded in a structured review of several core dimensions of the market, including the country's experience with the Clean Development Mechanism and the development of the domestic carbon tax offset system.

The study also examined current supply-side dynamics, including the types of carbon projects being developed, the standards under which credits are issued, and the sectors with the greatest potential for credit generation. This work revealed significant supply-side potential across sectors, including waste management, energy, and nature-based solutions. However, credit generation remains constrained by limited early-stage project finance, gaps in institutional capacity, and the absence of a national carbon credit registry that is fully aligned with international systems. Unlocking this potential will require targeted technical support as well as greater legal clarity around revenue-sharing mechanisms and municipal procurement processes.

Emerging demand trends were also explored, both from regulated emitters operating under the carbon tax framework and from voluntary corporate buyers seeking to meet sustainability, ESG, and net-zero commitments. Voluntary demand for carbon credits is growing but remains fragmented, with no national strategy in place to coordinate or scale corporate offsetting in alignment with ESG or net-zero commitments.

3. MODELING CARBON CREDITS SUPPLY AND DEMAND

The assessment of South Africa's carbon credit supply and demand through 2035 combined a probability-weighted project pipeline model with a demand model linked to the phases of South Africa's Carbon Tax Act. This examined the potential pipeline of carbon projects across key sectors and assessed the scale of future demand from domestic and international buyers.

On the supply side, the model incorporated key project-level risks and uncertainties, including registration and issuance probabilities, development timelines, and sector-specific penetration rates. This approach enabled a more realistic estimation of the potential carbon credit pipeline by accounting for delays, attrition rates, and project execution risks.

On the demand side, projections were anchored in the evolving phases of the Carbon Tax Act, which currently provides the primary domestic compliance-driven demand for offsets. Future market dynamics were tested across five shared socioeconomic pathways (SSP) scenarios (SSP1–SSP5) to capture a range of potential economic, policy, and climate transition trajectories.[1]

International drivers, such as potential carbon credit exports under Article 6 of the Paris Agreement, demand from the Carbon Offsetting and Reduction Scheme for International Aviation, and implications of the EU's Carbon Border Adjustment Mechanism, were incorporated as sensitivity analyses rather than baseline assumptions. In addition, Sectoral Emission Targets and carbon budgets were excluded from the demand model, as offsets cannot legally be used for compliance under these mechanisms.

The scenario results reveal divergent market dynamics in the short term. Under SSP1 and SSP4, the market experiences a temporary surplus of carbon credit supply, while the others indicate persistent supply shortfalls. More pronounced shifts emerge after 2030, when key structural assumptions such as access to Article 6 markets and the potential inclusion of South Africa's state-owned electricity utility, Eskom, in Phase 3 of the Carbon Tax begin to significantly influence the overall supply-demand balance.

4. FINANCIAL MODELING TO INFORM INSTRUMENT DESIGN

Our analysis highlighted several key enablers that could facilitate the development of South Africa's VCM. To improve supply , first-loss capital could absorb early-stage risks related to project development and revenue volatility. In addition, the development of carbon market financial instruments and standardized methodologies could help to manage tenor mismatches and improve price discovery. To improve liquidity, greater participation from commercial financial institutions and DFIs, along with listing a carbon-credit-linked bond on the JSE, could help develop secondary markets and address Basel III capital constraints.

Strengthening integrity will require robust MRV systems, linking financial instruments to internationally recognized standards and registries, and strong governance frameworks to prevent the issuance and trading of low-quality carbon credits.

[1] Shared Socioeconomic Pathways (SSPs), as defined in the IPCC Sixth Assessment Report in 2021, are climate scenarios that describe alternative global socioeconomic developments up to 2100 and are used to model greenhouse gas emissions under different policy choices. They combine qualitative narratives with quantitative projections on factors such as population, urbanization, and GDP, and can be analyzed using Integrated Assessment Models to explore future climate and development pathways. The five SSPs are SSP1 Sustainability Taking the Green Road, SSP2 Middle of the Road, SSP3 Regional Rivalry A Rocky Road, SSP4 Inequality A Road Divided, and SSP5 Fossil fueled Development Taking the Highway. These scenarios are adjusted and adapted to reflect specific analytical contexts and assumptions. Chapter 3: Mitigation pathways compatible with long-term goals

Designing financial instruments that can address these challenges involved financial, environmental, and social modeling to inform the instrument design.

A. FINANCIAL MODELING

Financial modeling of the incubation pathway to test feasibility, pricing dynamics, and risk allocation of the Carbon Credit-Backed Bond was done by explicitly integrating dual revenue streams from project income and carbon credits. Building on a traditional project finance baseline, the model first established pre-carbon equity returns, which are typically marginal or negative, thereby illustrating the structural financing gap in carbon projects. Carbon revenue was then introduced as an additional cash flow, allocated between debt and equity to enhance returns for both parties, improving equity IRR and increasing debt yield above the contractual interest rate. Key structuring levers using the carbon revenue split and interest rate were tested through sensitivity analysis to identify optimal configurations that balance investor returns and project viability. The model is designed with the flexibility to dynamically adjust the interplay between interest rates and carbon credit allocations, enabling the identification of an optimal return profile for both debt and equity participants. The modeling further incorporates portfolio aggregation and scenario-based demand and supply projections to reflect market uncertainties and policy dynamics.

This approach enables the instrument design to be grounded in realistic market conditions, as well as iterative refinement of financial structures to align with stakeholder risk appetites and scalability objectives within the broader incubation process.

B. ENVIRONMENTAL AND SOCIAL MODELING

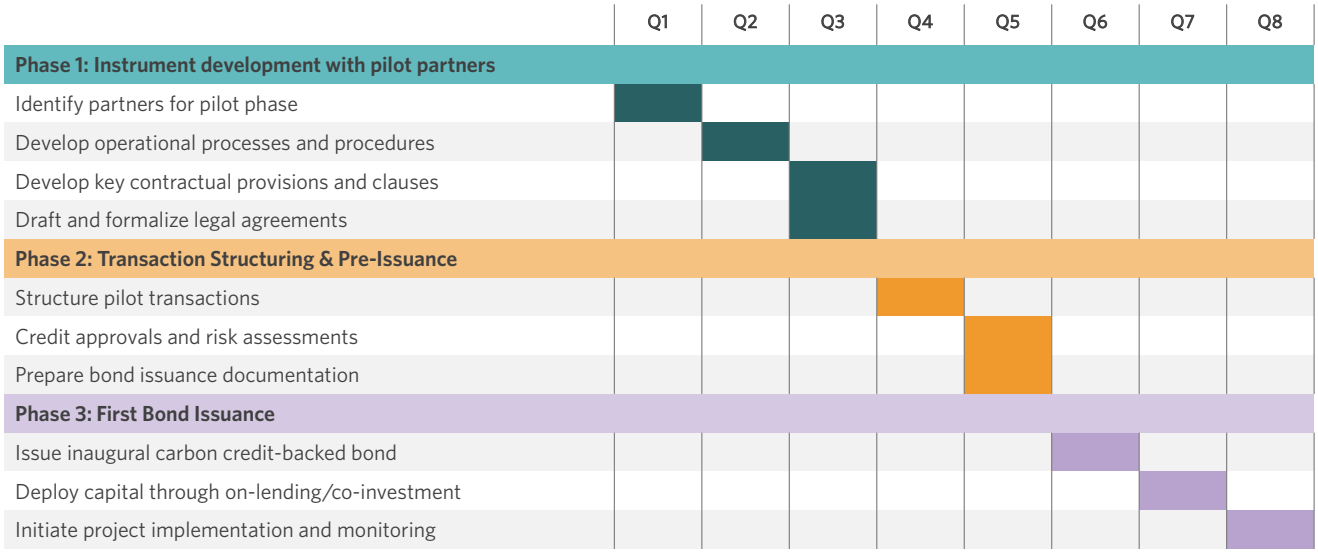
Environmental and social modeling was also conducted to assess the benefits of South Africa's carbon market. This analysis layered SDG contributions as reported by project developers under the CDM, VCS, and Gold Standard frameworks onto the supply and demand model, weighting these contributions by projected credit volumes and grouping them by sector. This structured proxy approach was then stress-tested across scenarios tied to the IPCC SSPs to explore how different policy, market, and investment conditions shape both carbon credit dynamics and associated development outcomes. The results showed that SDG contributions are heavily dominated by SDG 13 (Climate Action) and SDG 15 (Life on Land), and are driven primarily by sector composition, particularly the outsized role of agriculture, forestry, and other land use projects, rather than by broad or uniform development impacts. Optimistic scenarios (SSP1 and SSP 2 produced higher credit volumes and modestly wider SDG coverage, while the pessimistic SSP4 and SSP5 scenarios narrowed the profile considerably. See Section E for further details on expected climate and social impact.

C. IMPLEMENTATION PATHWAY

The implementation pathway for the Carbon Credit-Backed Bond is a phased progression from pilot design to market scale-up, aligned with DBSA's institutional mandate and existing green finance infrastructure. If approved by the DBSA board, the instrument will be housed within DBSA's climate finance function , leveraging its Green Bond Framework, treasury capabilities, and established relationships with commercial banks.

- **A pilot phase** would focus on validating the financial model, structuring initial transactions, and securing participation from key financial intermediaries and project developers. This phase includes refining eligibility criteria, standardizing term sheets, and confirming operational processes for carbon credit flows and MRV.
- **The initial deployment phase** would see DBSA issue the first carbon credit-backed bond and deploy proceeds through on-lending and co-investment structures with partner banks. This stage prioritizes building a pipeline of bankable carbon projects and demonstrating proof of concept in live market conditions.
- **The scale-up phase** focuses on expanding issuance volume, deepening private sector participation, and integrating the instrument into domestic capital markets, including potential listing on the JSE. Over time, the model is expected to evolve into a replicable financing platform that can be extended across sectors and geographies, supported by strengthened market infrastructure, improved price discovery, and growing investor familiarity with carbon-linked financial products.

Figure 6. Proposed bond implementation timeline



D. POTENTIAL RISKS AND CHALLENGES

The table below summarizes the key risks and challenges that may arise in deploying the proposed instruments. Identifying these early can help stakeholders proactively design solutions and reduce barriers to scale.

Challenge	Description	Addressing the Challenge
Limited bankable carbon credit-generating projects in South Africa	Low availability of investment-ready carbon projects due to early-stage development risks	Support pipeline development through partnerships, technical assistance, and early-stage financing mechanisms; prioritize sectors with established methodologies
Uncertainty about future carbon credit volumes	Variability in project performance, issuance timelines, and verification outcomes creates uncertainty in projected carbon revenues , thereby undermining the predictability of cash flows and adversely affecting the pricing, risk assessment, and overall bankability of the financial instruments	Apply conservative assumptions and scenario analysis in financial models; diversify across projects and sectors to mitigate volume risk
Thin secondary markets for carbon credits	Limited liquidity and trading activity restrict exit opportunities and reduce the attractiveness of carbon as a financial asset	Support development of market infrastructure; enable aggregation of credits; explore listing instruments on platforms such as the JSE to enhance liquidity
High-Quality Liquid Assets (HQLA)	Banks must hold capital in HQLA, which limits their ability to allocate balance sheet capacity to less liquid carbon-linked instruments	Should the bond be structured to approximate HQLA, it could incentivize banks to hold such instruments
Price discovery challenges due to fragmented trading venues	Fragmented trading venues and the absence of a centralized, transparent pricing mechanism lead to inconsistent price signals, making valuation difficult and increasing uncertainty for investors	Promote participation in formal trading platforms; utilize benchmark pricing where available; incorporate price sensitivity analysis in structuring
Floating vs fixed rates	Carbon credit–linked bonds with fixed interest coupons are likely to be less popular, as they do not provide the same protection against inflation and interest rate volatility, reducing their attractiveness to investors	Allow the option to make interest coupon payments with floating or fixed interest rates
Basel III requires a capital of 60% of the value of carbon credits	Basel III requires banks to hold capital of around 60% of the value of carbon credits, making it costly to retain these assets on the balance sheet. This high capital charge constrains balance sheet capacity, reduces returns on capital, and limits banks' willingness to participate in carbon credit–linked instruments at scale.	Structure instruments to minimize on-balance sheet exposure, such as through repo-style arrangements or risk transfer mechanisms, and involve DFIs to absorb or redistribute risks, thereby improving capital efficiency and enabling greater bank participation
Lack of consistent MRV (Measurement, Reporting, Verification) standards	Variability in standards and verification processes undermines confidence in credit quality and environmental integrity	Align with internationally recognized standards (e.g., VCS, Gold Standard); require third-party verification; support development of local MRV capacity
Delays and ambiguity in domestic carbon regulations	Carbon credits are not yet formally classified under the South African Financial Markets Act (FMA), which limits the ability to list carbon-linked instruments on exchanges and restricts access to deep institutional capital pools	Engage with the regulator, Financial Sector Conduct Authority (FSCA), while in the interim viewing the bond as sustainability-linked.
Need for stronger governance and registry transparency	Weak governance structures and limited transparency in registries increase reputational and operational risks	Strengthen governance frameworks; require transparent reporting and independent verification; support development of robust national registry systems

E. EXPECTED CLIMATE AND SOCIAL IMPACT

The development of a well-functioning VCM in South Africa could deliver a range of meaningful climate, environmental, and socioeconomic benefits. The market would channel investment toward climate mitigation and land conservation at scale, while also generating broader development outcomes, including job creation, improved access to clean energy, and more responsible production practices.

Agriculture, forestry, and land use projects, which are expected to form a significant part of the market, carry additional potential for community-level benefits, including improved livelihoods and ecosystem services. While gender-related benefits are not yet explicitly tracked in current project reporting frameworks related to carbon credits, these project types tend to have meaningful gender dimensions, particularly around land tenure, household energy access, and women's livelihoods.

RELEVANT KEY PERFORMANCE INDICATORS[2]

The following (non-exhaustive) list of key performance indicators (KPIs) has been identified for developing a robust VCM ecosystem. Where possible, these are designed to align with existing international standards or DBSA's own approach to measuring climate impact.

Impact area	Potential KPIs
Climate	▪ GHG emissions reductions (tCO_2e) ▪ Volume of carbon credits issued (tCO_2e)
Environmental	▪ Area of land restored, conserved, or reforested (hectares) ▪ Biodiversity indicators (e.g., species protection, habitat restoration) ▪ Water usage and water conservation metrics
Economic	▪ Number of jobs created (direct and indirect) ▪ Income generated for local communities ▪ Investment mobilized (public and private)
Social	▪ Number of beneficiaries (households/communities impacted) ▪ Access to clean energy leading to improved health (households electrified or gas stoves used)
Health	▪ Reduction in incidence of respiratory illnesses (e.g., asthma, COPD) ▪ Reduction in premature deaths attributable to air pollution ▪ Number of people with improved indoor air quality (e.g., through clean cooking solutions)
Process/Market	▪ Number of projects by sector and standard (CDM, VCS, Gold Standard) ▪ Share of projects contributing to multiple SDGs

[2] This is based on the social and environmental modeling done to support the study and instrument design

MEASUREMENT CONSIDERATIONS AND DATA REQUIREMENTS

The current modeling framework relies on SDG contributions as self-reported by project developers under the CDM, VCS, and Gold Standard programs. These contributions are fixed at the project level and weighted by projected credit volumes to produce scenario-specific SDG profiles. As a result, the measurement approach is a structured proxy rather than a direct impact assessment. Key data requirements include continued access to project-level SDG disclosure documentation across all three crediting standards, updated credit volume projections linked to scenario assumptions, and sectoral supply composition data to enable accurate weighting. A recognized limitation is that the consistency and depth of SDG reporting vary materially across projects and programs, meaning the observed profiles reflect both genuine sectoral characteristics and differences in disclosure practices. New or strengthened monitoring systems could play a critical role, but their effectiveness would depend on coordinated changes across the broader SDG architecture.

V. REPLICATION AND CATALYTIC POTENTIAL

DBSA's operations in 22 geographic regions in sub-Saharan Africa give it the geographic reach and established public and private sector relationships to scale financial instruments that support VCMs in countries beyond South Africa. These include countries such as Namibia, Botswana, Kenya, Mauritius, and others that have well-developed debt capital markets and high use of fossil fuels. DBSA may carry out similar carbon-linked financial instruments pilots in the rest of its operating region.

The Southern African Power Pool (SAPP) countries could also be relevant to the South African carbon market if electricity imports are subject to the Carbon Tax passthrough. Under such an arrangement, countries purchasing electricity from Eskom would indirectly bear the tax through higher tariffs, creating a channel for credits generated in SAPP countries to be recognized as compliance credits in South Africa. Mitigation opportunities in these countries fall into three main categories: household cookstove adoption, renewable energy deployment, and avoided deforestation (REDD+).

Regionally, South Africa supports the African Carbon Markets Initiative, whose roadmap targets 300 million African credits issued or retired each year by 2030. Such regional initiatives are expanding the landscape for credit generation and trading.

On the global level, South African credits may also be used for Other International Mitigation Purposes, referring to internationally transferred mitigation outcomes transferred and used outside of a country's NDC achievement. These include offsetting claims made by international corporates (e.g., for "carbon neutrality") or future ESG-linked trade mechanisms.

VI. REFERENCES

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VII. ANNEX

ABOUT FiCS FINANCIAL INNOVATION LAB

Finance in Common (FiCS), the Inter-American Development Bank (IDB), and the Climate Policy Initiative (CPI) have partnered to operationalize the FiCS Financial Innovation Lab, with CPI as its secretariat. The FiCS Lab aims to help public development banks (PDBs) address barriers to climate finance by sharing best practices, developing standardized approaches to climate instruments, and providing technical support to move ideas from inception to implementation.

Based on the FiCS final communiqué of September 2023, the vision of the FiCS lab is to bring together PDBs around an action-oriented platform to accelerate the implementation of climate finance and the broader agenda of the 2030 Sustainable Development Goals. The mission of the FiCS Lab is to be a platform that fosters innovation and collaboration among PDBs in mobilizing private capital and expanding climate finance, particularly in emerging markets and developing economies.

ABOUT CPI

CPI is an analysis and advisory organization with deep expertise in finance and policy. Our mission is to help governments, businesses, and financial institutions drive economic growth while addressing climate change. CPI has eight offices around the world in Austria, Brazil, India, Indonesia, South Africa, the United Kingdom, and the United States.

CPI is known as a leader in tracking sustainable investment trends, identifying innovative business models, and supporting the solutions that can drive a transition to a low-carbon, climate-resilient economy. We are unique in our focus on finance, our ability to get the right people to the table, and our analytical rigor.

ABOUT DBSA

The Development Bank of Southern Africa is one of the continent's leading development finance institutions, with a mandate to drive sustainable socio-economic development across South Africa and the broader African region. Established in 1983, the DBSA plays a pivotal role in advancing infrastructure-led growth by financing, preparing and implementing projects that deliver measurable development impact.

At the core of the DBSA's mandate is the improvement of quality of life for people in Africa. The Bank seeks to catalyse inclusive growth and regional integration by investing in infrastructure and human capacity, with the aim of fostering long-term, shared prosperity.

The DBSA offers integrated solutions across the full infrastructure development value chain - from early-stage planning and project preparation, through to financing, implementation and delivery. Its primary sectors of focus include energy, ICT, transport, and water and sanitation, while also supporting social infrastructure such as education, housing and healthcare.

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