

# CARBON CREDITS MARKET ACCESS FOR SMALLER-SCALE CLEAN ENERGY PROJECTS

2023





This study was produced by Open Capital in their capacity as Business Development Support providers for the EEP Africa Trust Fund.

**Disclaimer**  
The views expressed in this publication do not necessarily reflect the donor governments' official policies.

EEP Africa is hosted and managed by the Nordic Development Fund (NDF) with funding from Austria, Denmark, Finland, Iceland, NDF, Norway and Switzerland.

Published by EEP Africa  
Nordic Development Fund  
Fabianinkatu 34  
00100 Helsinki  
FINLAND

[info@eepafrica.org](mailto:info@eepafrica.org)  
[www.eepafrica.org](http://www.eepafrica.org)

Copyright © EEP Africa 2023

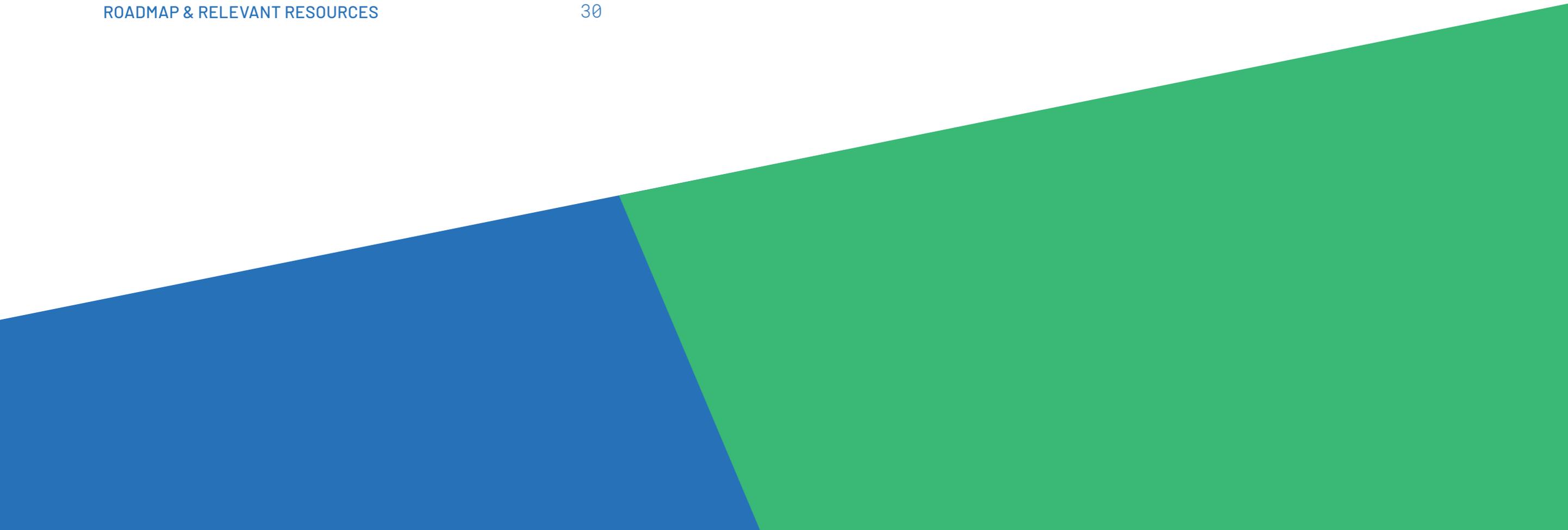


**Government of Iceland**  
Ministry for Foreign Affairs



## CONTENTS

INTRODUCTION TO CARBON CREDITS	04
AFRICAN CONTEXT	11
ELIGIBILITY, REGISTRATION & CERTIFICATION	15
RELATED COSTS & CARBON FINANCE DEPLOYMENT	23
ROADMAP & RELEVANT RESOURCES	30



# Introduction to Carbon Credits

# Carbon markets enable sustainable projects to get financing from entities looking to offset their carbon emissions

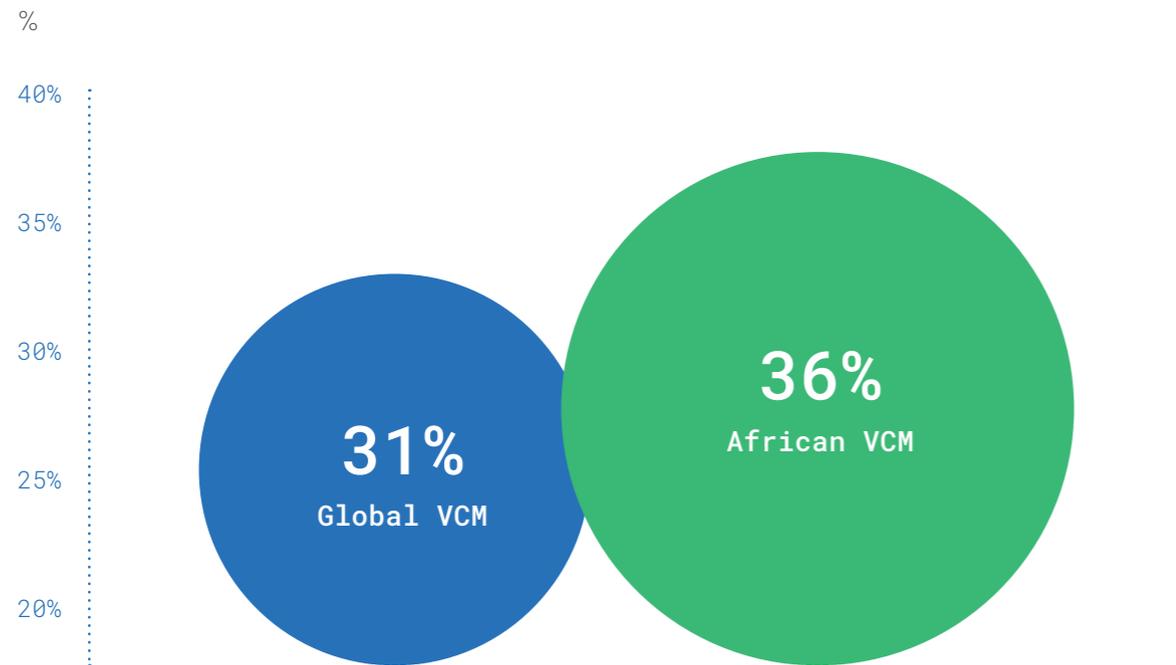
<h2>OVERVIEW OF CARBON CREDITS MARKET</h2>	<ul style="list-style-type: none"> <li>Carbon markets are trading systems in which companies that avoid or remove carbon from the atmosphere can sell credits to companies/individuals who want to reduce their carbon footprint, becoming a new revenue stream.</li> <li><b>A carbon credit equals one tonne of carbon dioxide</b>, or the equivalent amount of a different greenhouse gas reduced, sequestered, or avoided.</li> </ul>
<h2>TYPES OF CARBON CREDIT MARKETS</h2>	<p>There are two main types of carbon markets:</p> <ul style="list-style-type: none"> <li><b>Compliance Markets:</b> Mandatory systems regulated by government entities to cap emissions for specific industries e.g., EU Emission Trading System (ETS), South African Carbon Tax Offsets.</li> <li><b>Voluntary Carbon Markets:</b> Platforms in which carbon credits can be purchased by those who voluntarily want to offset their emissions e.g., Voluntary Carbon Standard (Verra).</li> </ul>
<h2>MAIN TYPES OF CARBON CREDITS PLAYERS</h2>	<p>There are two main types of carbon market players:</p> <ul style="list-style-type: none"> <li>Carbon credit <b>producers/project developers:</b> <ul style="list-style-type: none"> <li><b>Avoidance/Reduction:</b> Those that prevent/reduce the release of carbon into the atmosphere such as clean cooking and renewable energy.</li> <li><b>Removal/Sequestration:</b> Those that remove carbon from the atmosphere such as reforestation and direct Methane Capture.</li> </ul> </li> <li>Carbon credit <b>buyers:</b> They are typically corporations located in Europe, North America, or a country with a carbon tax in sectors such as energy, consumer goods, airlines, technology.</li> </ul>

*Globally, the demand for carbon credits exceeds supply, with carbon offset projects in emerging markets that offer other SDG benefits fetching the highest; this presents an opportunity for African project developers to tap into the market.*

# Global carbon markets have been on upward trend in the wake of the Paris Agreement, reaching a record-high of USD 84 billion in 2021

## CARBON REVENUE HAS GROWN AT 25% CAGR SINCE 2014

Global and African VCM CAGR (2016-2021)<sup>1</sup>



Source: 1) ACMI, [link](#)

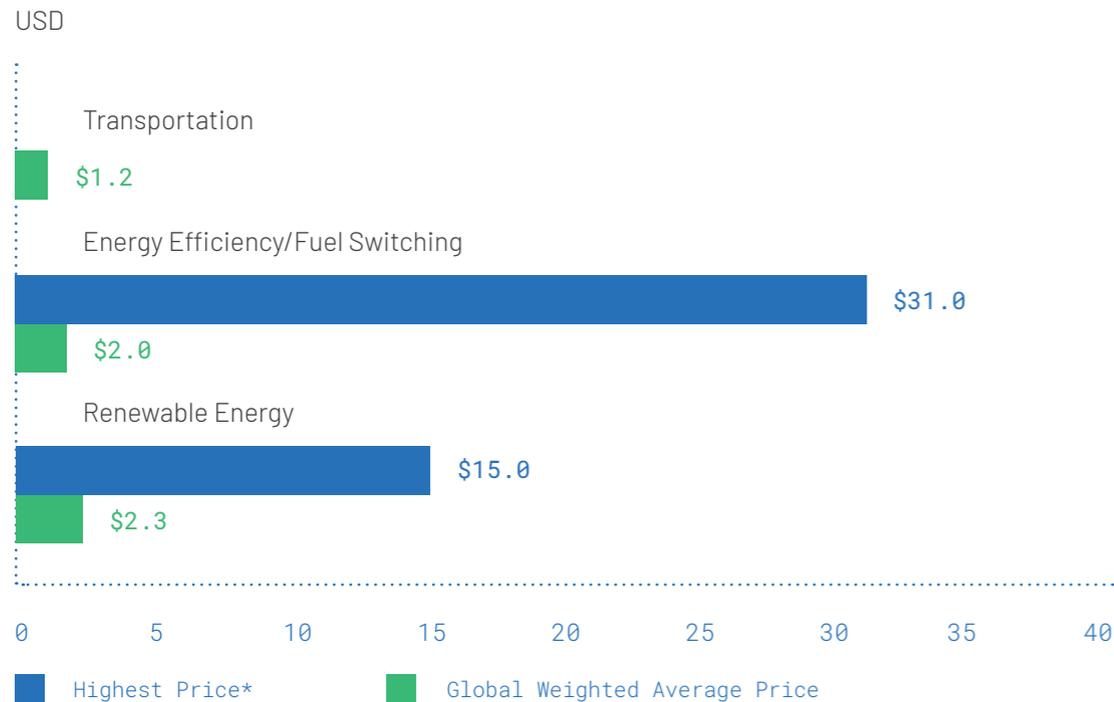
## HIGH GROWTH IS MAINLY ATTRIBUTED TO THE 2015 PARIS AGREEMENT

- **New climate targets through the 2015 Paris Agreement has led to the opening of new international compliance carbon markets** where countries and companies can trade carbon credits, including major markets like China.
- **Article 6 of the Paris Agreement allows for transfer of carbon credits** earned from the reduction of GHG emissions between countries to help each other meet their climate targets set out in their Nationally Determined Contributions (NDCs).
- **With limited supply of carbon credits, the price has also increased;** registering new carbon credit projects is a lengthy process which cannot quickly be scaled up to meet demand.
- **There has also been increased auctioning in emissions trading systems** due to the increased demand for carbon credits by governments and companies to meet the new climate targets.

< *The African Voluntary Carbon Markets are expanding, slightly outpacing the global markets.*

# Market price for carbon credits varies widely, from USD ~1-50, depending on the attractiveness of the project and buyer's WTP

## PRICES OF CARBON CREDITS IN VOLUNTARY MARKETS, 2021



## FACTORS LEADING TO VARIED CARBON CREDIT PRICES



**Value of beyond-carbon benefits:** Projects with added non-carbon benefits/impact fetch higher carbon credit prices due to greater value.



**Size of the project:** Small projects contribute greater impact but are more expensive. Higher carbon credit prices help recover the costs.



**Location of the project:** Areas that are difficult to implement projects benefit more, hence prices are higher to improve viability.



**Age of the project:** Some argue that emissions avoided or reduced a few years ago are more valuable hence higher carbon credit prices.



**Differences in methodologies:** Prices differ due to the emission methodology used.



**Economies of scale:** Larger organizations benefit from bulk purchases since project developers can provide discounts.



**Quality of the project:** The quality is evaluated based on its certification standard.

Notes: Highest Price\* - these prices are from projects listed on the Gold Standard registry as of October 2022. The prices are indicative  
 Sources: Ecosystem Marketplace, "State of the Voluntary Market 2021" - [link](#); Gold Standard, "Carbon Pricing : Why do prices vary by project type?" - [link](#); Gold Standard - [link](#)

# There are 10 significant types of carbon credit avoidance and removal projects



## RENEWABLE ENERGY

Biomass  
Geothermal/Hydro/Solar/Wind  
Energy efficiency  
Waste heat recovery  
Fossil fuel decommissioning  
Distributed renewable energy



## HOUSEHOLD DEVICES

Clean cookstoves  
Solar home systems



## INDUSTRY GASES

N<sub>2</sub>O from nitric and adipic acid plants  
Ozone-depleting substances  
Carbon capture and storage  
Coal mine methane



## WASTE MANAGEMENT

Waste management  
Landfill gas  
Wastewater treatment



## ENGINEERED CARBON DIOXIDE REMOVAL (CDR)

Direct air capture (DAC)  
Bio-Energy with CCS (BECCS)  
Biochar



## TRANSPORT

EV charging  
Synthetic fuels



## LIVESTOCK

Rotational grazing  
Food additives



## AGRICULTURE AND SOIL SEQUESTRATION

Cover crops  
Fertilizer/N<sub>2</sub>O  
Grassland and sustainable land management  
No- and low-till agriculture  
Agroforestry



## FORESTRY AND LAND USE

Afforestation/reforestation  
Revegetation (ARR)  
Improved forest management (IFM)  
Conservation  
Peatlands  
Savannah fire management



## BLUE CARBON

Saltmarsh  
Mangrove  
Seagrass  
Kelp forests  
Bottom-trawled sediments  
Seaweed farms

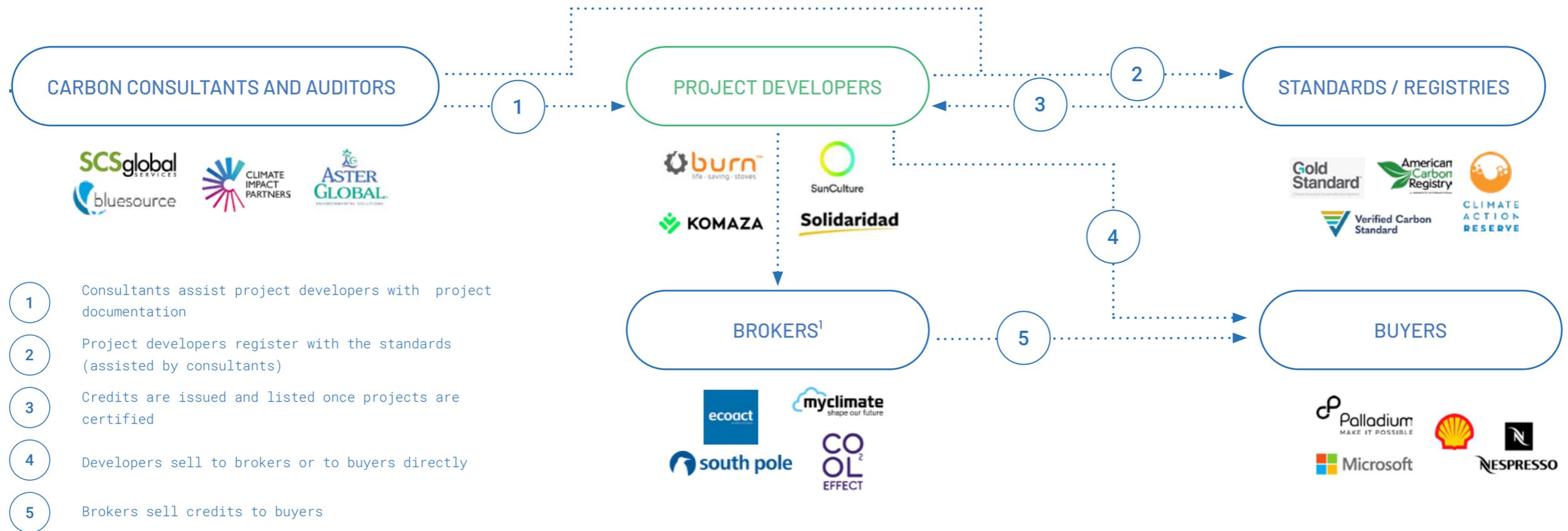
Avoidance offsets
  Removal offsets
  Avoidance/removal offsets

# Several types of ecosystem players play key complementary roles to ensure active participation in the issuing of carbon credits

	Project developers	Consultants and auditors	Standards (registries)	Buyers	Brokers	Financiers
Description	Companies, NGOs or governments that develop solutions for climate change.	Companies or individuals that assist developers with the certification process e.g., measurement, documentation.	Carbon offset programs that certify carbon emissions reductions and act as a clearinghouse for sellers/buyers.	Companies, individuals, NGOs looking to offset their carbon emissions.	Intermediaries who buy credits from developers to market and sell to a network of buyers.	Companies/individuals/DFIs that finance the carbon credit registration process.
Engagement	Small companies are part of this group as they run climate change projects.	With the help of aggregators, small companies typically do not need to engage them.	Small companies engage them through aggregators.	Small companies can engage them through aggregators or directly.	Small companies engage them directly as they help them with carbon credits registration and sale.	Small companies can engage them directly or through aggregators.
Examples						

Sources: Verra; OCA Analysis

# The relationships between the key players in the carbon credit market can be summarized in several steps

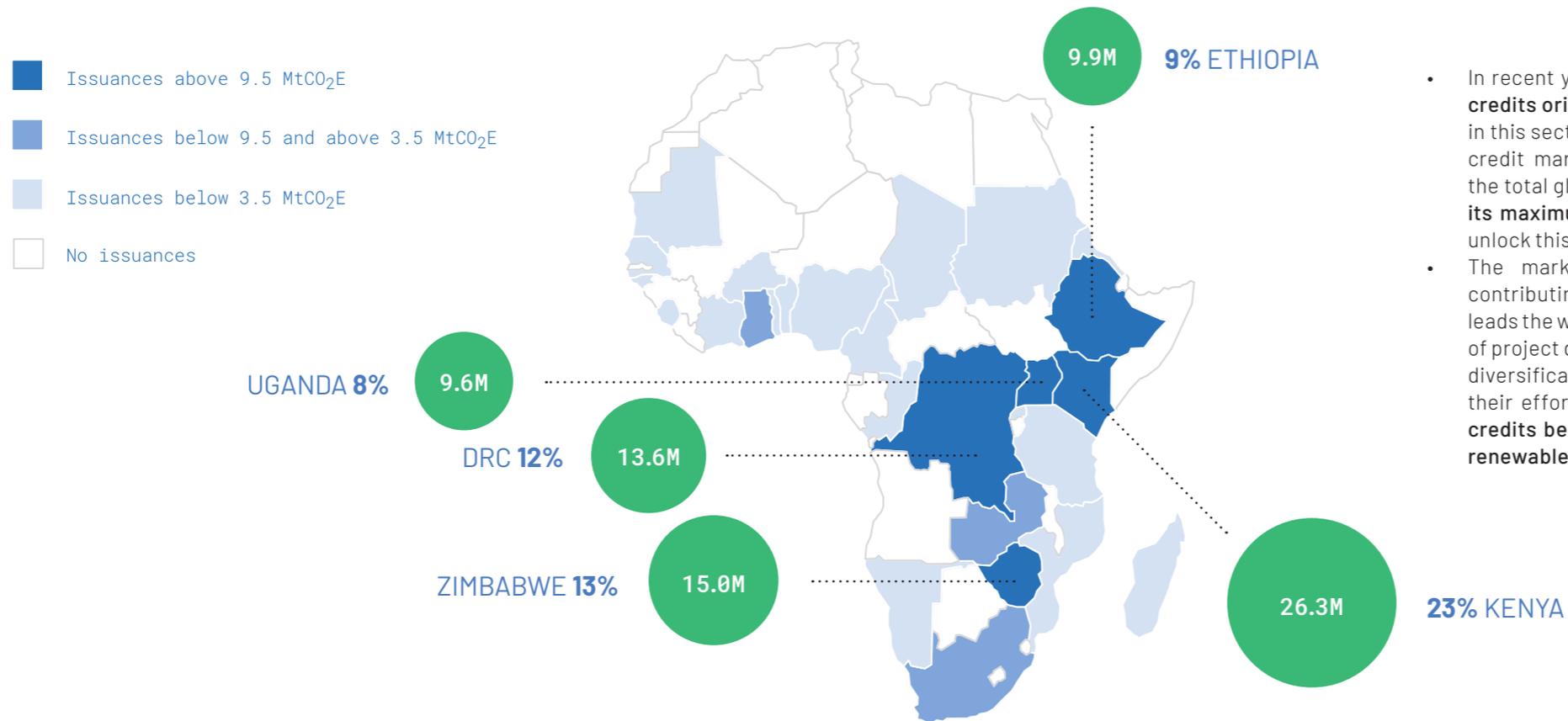


Sources: Financial Times - [link](#); Abatable - [link](#)  
 Notes: CCs - Carbon Consultants

African context

# The African carbon credits market has significant scope for growth, having attained only 2% of its full potential to date

CARBON CREDIT ISSUANCES BY COUNTRY (2016 – 2021)<sup>1</sup>



- In recent years, there has been a **growth in the demand for carbon credits originating from Africa**, surpassing the overall global growth in this sector. Despite the strong potential within the region's carbon credit market, which currently accounts for approximately 11% of the total global carbon credit issuance, it **has only tapped into 2% of its maximum potential**. Several initiatives are being undertaken to unlock this untapped potential.
- The market exhibits **fragmentation**, with just five countries contributing to approximately 65% of the total issued credits; Kenya leads the way with a 23% share. The market comprises a small number of project developers, typically operating on a small scale with limited diversification. These developers have predominantly concentrated their efforts on similar project types, with roughly **97% of carbon credits being issued for projects related to forestry and land use, renewable energy, and household devices**<sup>2</sup>.

Sources: 1. FSD Kenya, [link](#) 2. ACMI, [link](#)

# Market-related challenges primarily hinder the development of the carbon credits market in Africa



## SUPPLY AND STANDARDS

### Project development:

- Limited number of project developers and low capacity of project developers.
- Complex and unfavourable regulatory landscape.

### Validation & certification:

- Methodologies not always relevant for African-based project developers.
- High costs and long lead times for certification, validation and verification.



## INTERMEDIATION & FINANCING

### Intermediation:

- High reliance on relationships, brokers and traders to access the VCM market.
- High intermediary costs, which reduce revenue share for developers.

### Financing:

- Limited mechanisms to de-risk and enable investment in project development and supply (e.g., futures contracts, project supply-chain financing, insurance).



## DEMAND

- Concerns on the integrity of certain credit types (e.g., emissions reduction / avoidance related to fossil fuel transition).
- Shifting and confusing demand trends that could impact common African carbon credit types (e.g., confusion around the role of avoidance credit types for high integrity offsets).
- Pricing may not accurately reflect the value of Africa carbon credits and their co-benefits (e.g., energy access, biodiversity).

# Small businesses in Africa face additional challenges that restrict their direct access to the carbon credit market

Small businesses face additional obstacles that hinder their direct engagement in the carbon credits market, in addition to the broader market and business-related challenges leading to unfair competition and market distortion. These challenges include **high associated costs, required scale, and a lengthy and cumbersome process.**



**Costs:** The carbon markets registration and verification process from project documentation to credit issuance and commercialization costs \$100k - \$500k. The high financial commitment poses affordability challenges for small businesses. This excludes project development costs which are equally significant.

---



**Scale:** Generally, a project should be able to generate at least \$~300k+ in carbon revenue to make it economically viable to pursue the carbon credit registration process. This necessitates a larger scale of operation which small companies may not readily achieve.

---



**Lengthy and cumbersome process:** It can take 2 to 5 years for a project to go through the entire carbon credit cycle (depending on the type of project, its requirements, and involved verification process, the quality of the project, and the efficiency of the registry), with a lot of required documentation. This means that companies need to devote resources to an opportunity that will take years to generate income while continuing to operate their business.

# Eligibility, Registration & Certification

# To access this growing carbon market, companies need to demonstrate that they have a sellable carbon asset



**Additionality:** A project must show that it is responsible for reducing carbon emissions or sequestering carbon and that these reductions would not have happened if the project didn't exist.

---



**Measurability:** All emissions reductions and carbon removals have undeniably occurred and have been quantified using a robust methodology to ensure the authenticity of the carbon offsets.

---



**Verification:** The project must undergo monitoring, reporting, and verification which be conducted by a reputable third party.

---



**Unique:** Carbon credits should not be traded by multiple parties or used to fulfil multiple emission targets to prevent double counting.

---



**Permanence:** Carbon reduction or removal is permanent, with no chance for reversal, and has been independently verified by a credible third party.

*Not all projects that mitigate climate change can generate carbon assets as they must meet certain criteria to ascertain that the project has a significant impact on removal of emissions.*

# Certification standards play a key role in authenticating carbon offset projects to ensure they have a quantifiable impact

## PROJECT CERTIFICATION VERIFIES PROJECT IMPACT

- Carbon standards govern the rules, procedures, and methodologies according to which certified carbon credits are generated and issued.
- Certification gives buyers the assurance that the emission reductions claimed are real, additional, verifiable and leave a lasting impact.
- Certification also helps guard developers and buyers against the reputation of **blood carbon**, that has proved to be a significant market challenge in recent years.

## COMPLIANCE MARKET STANDARDS



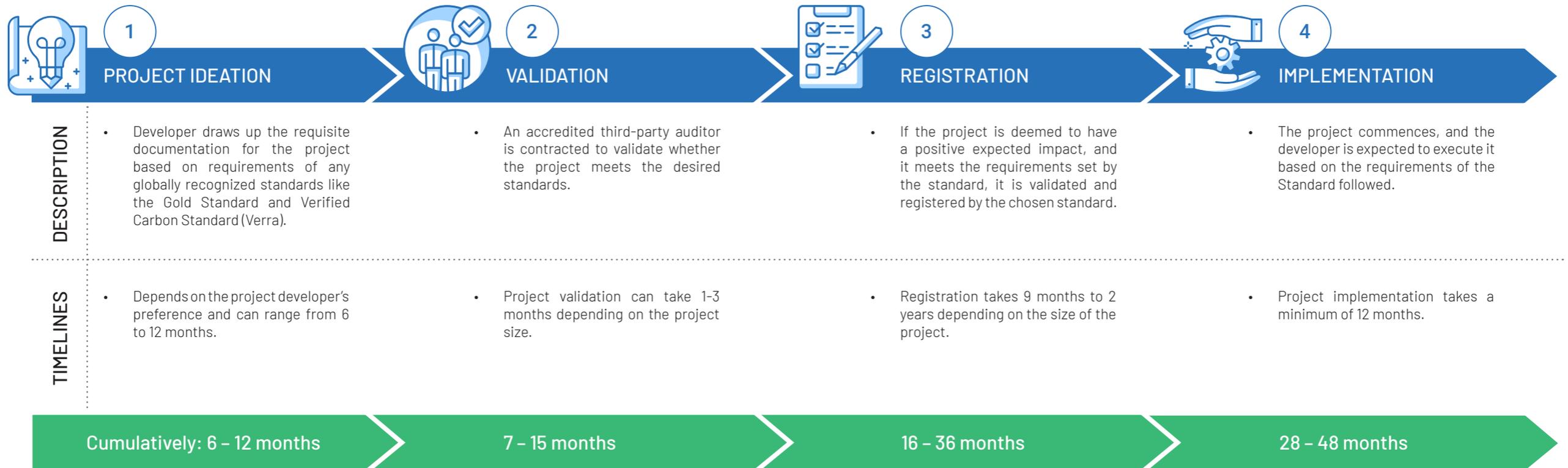
## VOLUNTARY MARKET STANDARDS



*Verified Carbon Standard accounted for 62% of global market share of carbon credit issuances in 2021;*

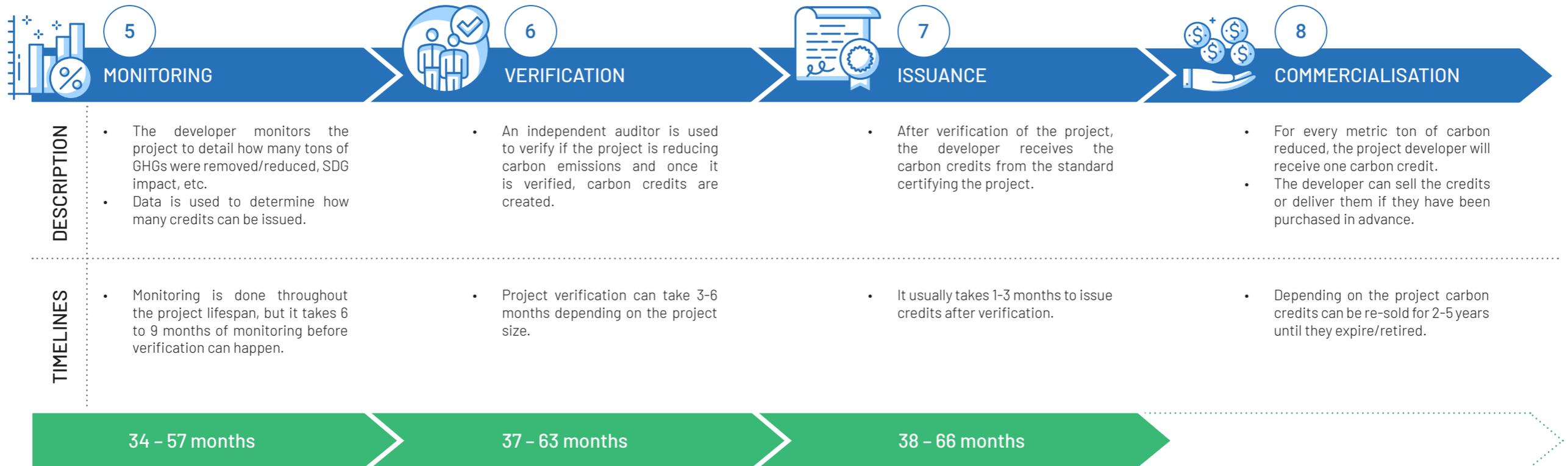
*Gold standard is popular in Africa due to social and environmental co-benefits integrated into the standard.*

# Carbon credits registration, certification, and commercialization is an 8-step process; can take between 2-5 years (1/2)



*As part of the documentation process, every project developer is required to carry out local stakeholder consultations to assess the potential impact of the project within its location.*

# Carbon credits registration, certification, and commercialization is an 8-step process; can take between 2-5 years (2/2)



The overall timeline from project ideation to commercialization of credits can range from 2-5 years, depending on the project size and type.

# Project registration presents the biggest time bottleneck due to the intense nature of validation of projected GHG emissions



# Most existing methodologies are inapplicable in a SSA context; energy companies can leverage the following approaches (1/2)

Majority of the methodologies developed by carbon standards are not adaptable to the measurement and monitoring in Africa, due to the fragmentation of carbon assets, infrastructure challenges, and technology inaccessibility making it difficult for African project developers to meet the requirements<sup>1</sup>.

## FACTORS TO CONSIDER WHEN SELECTING THE RIGHT METHODOLOGY<sup>2</sup>



### Project objectives alignment

It is crucial that the methodology used aligns with your company's initiatives and scaling plans to ensure coherence between the chosen methodology and the goals of the project.



### Standards compliance

There are concerns of disproportionate costs and lack of traceability. Digital methodologies offer a pathway to more precise and customizable approaches for carbon offsetting.



### Practical implementation

Some methodologies are complex and hence require substantial technical proficiency and resources. Assessing the ease of implementation is vital, as it directly impacts the project's duration and costs.



### Recognized in the market

The credibility of the chosen methodology influences the attractiveness of your carbon credits to potential buyers; companies should therefore select methodologies that are widely accepted in the VCM.

# Most existing methodologies are inapplicable in a SSA context; energy companies can leverage the following approaches (2/2)

Small-scale energy companies in Africa can employ established methodologies endorsed by Verra and Gold Standard, which have been successfully used by similar companies listed or certified by these standards.

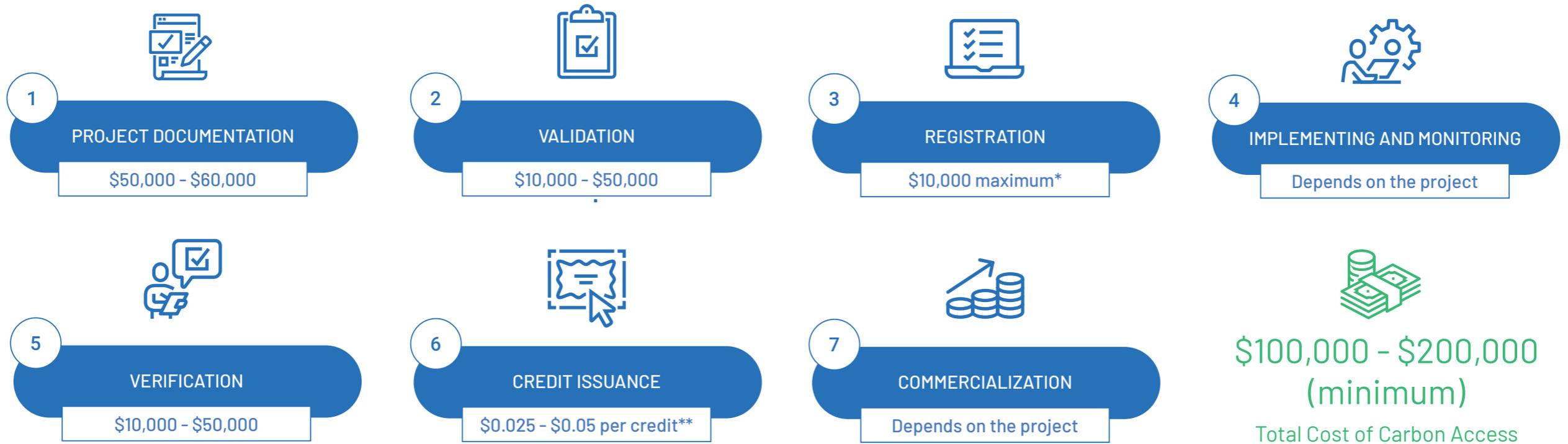
SECTOR	METHODOLOGIES	EXAMPLES
Energy efficiency – Transport sector	<ul style="list-style-type: none"> <li>AMS-III.S. Introduction of low-emission vehicles/technologies to commercial vehicle fleets.</li> <li>AMS-III.C. Emission reductions by electric and hybrid vehicles.</li> </ul>	 
Solar thermal – heat and electricity	<ul style="list-style-type: none"> <li>AMS-III.AR. Substituting fossil fuel-based lighting with LED lighting systems.</li> <li>AM0019 Renewable energy project activities replacing part of the electricity production of one single fossil-fuel-fired power plant that stands alone or supplies electricity to a grid = 21, excluding biomass projects.</li> <li>GS MS Simplified Methodology for Efficient Cookstoves v1.1.</li> </ul>	  
Biogas – heat and electricity	<ul style="list-style-type: none"> <li>GS TPDDTEC v3.1.</li> <li>GS TPDDTEC v 1.</li> </ul>	 
Biomass, or liquid biofuel	<ul style="list-style-type: none"> <li>GS SS Ecologically Sound Fuel Switch to Biomass v1.</li> <li>AMS-I.D. Grid connected renewable electricity generation.</li> </ul>	

Sources: Gold Standard, [link](#), Verra, [link](#)

Related costs & carbon  
finance deployment

# Participating across the carbon registration & commercialization process would typically cost a business USD 100-200k

To determine the feasibility of carbon credits as a revenue source, project developers need to assess the economic viability of the project and the operational commitments required throughout the project.



Source: Consultations with Brundtland Consulting, Climate Impact Partners and SCS Global services \*- Registration fee is (Estimated annual volume of emission reductions<sup>2</sup>) x (USD 0.10); capped at USD 10,000 \*\*-Price per CU depends on the number of CUs issued. The higher CUs issued, the lower the price per credit and vice versa, [link](#)

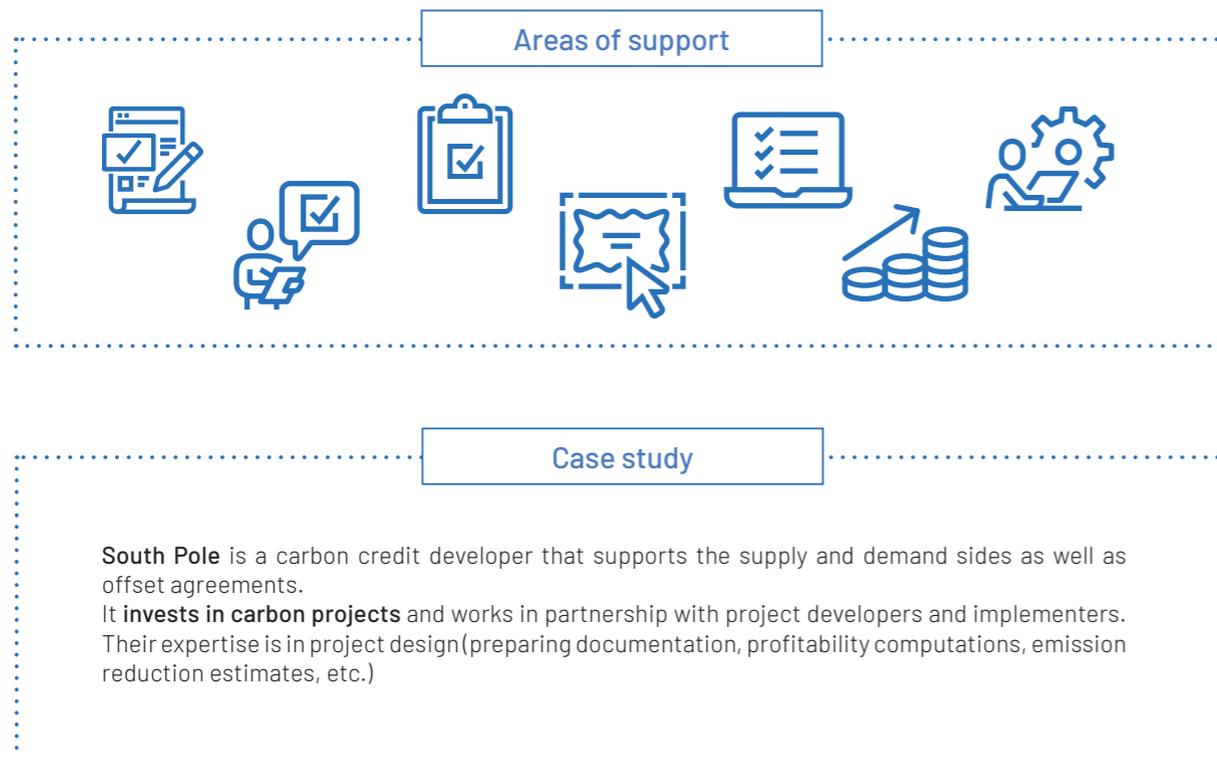
# Given the high cost for smaller companies, some emerging innovative approaches are helping address this challenge

**Cost-effective and innovative solutions** are emerging within the carbon credits market, catering to the needs of smaller businesses. This is anticipated to foster greater involvement from smaller companies in the market.

		EXAMPLE PLAYERS
<b>Pre-financing</b>	Small companies can establish financial agreements with buyers or investors, enabling them to secure funding for carbon reduction projects before they generate and sell carbon credits. Investors are reimbursed once the projects are commercialized. This approach helps facilitate the expeditious execution of carbon projects.	
<b>Aggregation &amp; consolidation</b>	Carbon project aggregators are emerging to facilitate the consolidation of carbon projects from smaller firms with similar technologies, enabling them to achieve the necessary scale for credit issuance, thereby reducing the costs and effort associated with small companies entering the carbon credits market.	    
<b>Disruptive technology platforms</b>	Small companies can leverage technology platforms to streamline and economize the process of obtaining carbon credits, making it more accessible and cost-effective for them. For instance, <b>Carbon Clear</b> helps reduce the costs of generating carbon credits from solar projects.	 

## Pre-financing: Though a nascent space, some funders are helping to provide financing for projects to help developers access VCM

Businesses can secure pre-financing to support the carbon credits registration and commercialization process by larger project developers or other investors, who typically fund either the entire process or specific aspects based on the contractual agreements.



### REQUIREMENTS FOR PRE-FINANCING

South Pole's approach to selecting carbon projects for investment hinges on a careful **evaluation of the project's total investment needs, associated risks, and specific considerations unique to each project.**

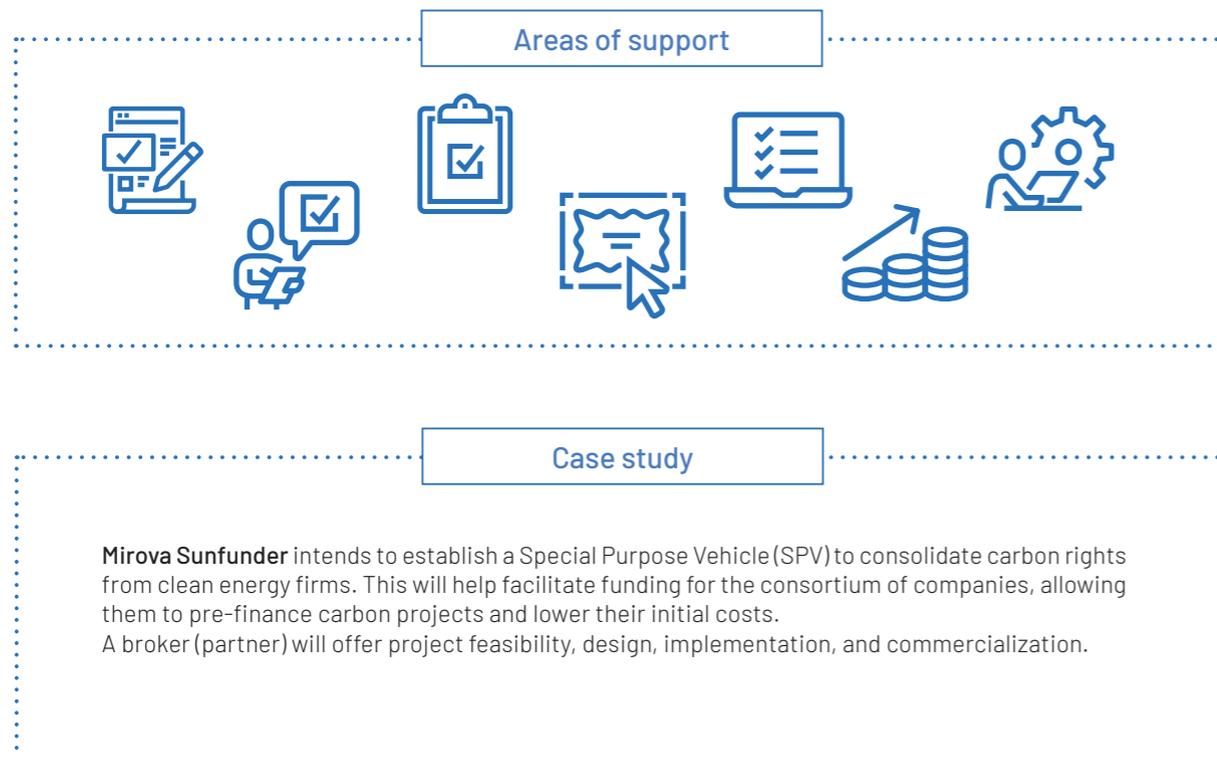
Their primary focus is on forging strong partnerships for carbon project development, recognizing the pivotal role that implementation plays in determining the quality of the carbon credits generated.

For organizations seeking to take advantage of pre-financing opportunities, it is imperative that they satisfy certain prerequisites:

- **Active Carbon Project:** The organization must have a carbon project that is actively in progress. This means that the project is not merely a conceptual idea but has already commenced its operations.
- **Basic Carbon Credit Eligibility:** The project must meet the fundamental criteria for carbon credit eligibility, which includes additionality, measurability, verifiability, uniqueness, and permanence.

# Aggregation/consolidation: Similar project developers have the option of engaging with the markets through aggregators

For businesses operating in similar carbon-credit generating projects (e.g., renewables), aggregators help eliminate much of the logistical challenges faced in the registration and commercialization process by pooling carbon rights and selling directly to willing buyers on the market.



## HOW AGGREGATION/ CONSOLIDATION WORKS

- Ecometrix Africa offers two financing models for renewable energy and energy efficiency projects: a **consulting model**, where clients pay upfront for consulting, auditing, and standard fees, and a **credit-sharing model**, where both parties agree on carbon credit sharing after commercialization, with the registration costs borne by the parties.
- Projects are grouped and registered with established standards. Clustering during verification can also be implemented. Overall, aggregation **enhances flexibility and boosts carbon credit generation, all while being more cost-effective and efficient.**
- Key requirements include the concept of "**additionality**," which is crucial in carbon asset development. Projects must be disclosed to the relevant standards, and credits cannot be generated for projects in existence for more than two years.

## Disruptive tech: Disruptors are further helping to link buyers with the market by reducing much of the upfront costs involved

Given the challenge of finding a sustainable pipeline of project developers, tech platforms further reduce the logistical challenge of matching willing buyers with developers at a fraction of the cost typically borne by the businesses.

### Areas of support



### Case study

**4R Digital** plans to launch the Carbon Value Exchange (CAVEX) platform, an innovative digital ecosystem designed to streamline the aggregation of carbon credits. It aims to facilitate carbon offsetting and the procurement of carbon credits for micro and small enterprises. Notably, 4R Digital recently secured \$3 million, earmarked for the platform's development.

### HOW TECHNOLOGY PLATFORMS WORK

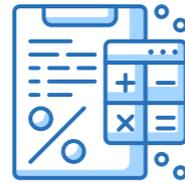
- 4R Digital engages in projects involving electric motorbikes, solar water pumps, and community-based reforestation initiatives, leveraging existing technology to efficiently gather and authenticate data related to carbon displacement and sequestration. This data, originating from various sources, will be consolidated into units for sale in the Verified Carbon Market (VCM).
- The accessibility of the CAVEX platform is designed to be **cost-effective** (10% sales commission). Additionally, the firm plans to remotely monitor environmentally-friendly projects, leading to reduced verification expenses.
- Buyers have the convenience of completing their purchases directly on the platform, with funds being disbursed to project developers via mobile money channels.

Once credit financing is deployed, it can be incorporated into a business' model to provide subsidies, increase efficiencies, etc.



### REVENUE SHARING

- Under this model, businesses directly provide a share of their carbon revenues directly with the direct beneficiaries (end-users).
- BioMassters' business model includes sharing **more than 25%** of its carbon revenues with its customers in the form of cashbacks.
- This ensures that the carbon finance flows back to the source of the emissions reduction – the customer.



### DIRECT SUBSIDIES

- Under such a model, businesses use the proceeds from carbon credits sold to reduce the end price passed on to their customers.
- An example is KOKO Networks, who provide carbon credits to companies looking to use their Net Zero commitments to accelerate and scale change in African forest conservation.
- KOKO uses the proceeds to accelerate adoption of the KOKO Fuel solution by low-income households who currently have no alternative but to use dirty, deforestation-based fuels.



### IMPROVED BUSINESS EFFICIENCY

- Under such a model, businesses use the proceeds from carbon credits sold to improve internal operations, ultimately reducing final costs of their products.
- In India, some businesses have used portions of their carbon revenues to improve cookstove maintenance and R&D, to develop new stove models that are more efficient and cost less in market.

# Roadmap & Resources

# So how does a company decide whether to pursue the carbon credit market?

There are two economic evaluation exercises that the business will need to undertake before deciding on whether to embark on the carbon credits registration process

## UNDERLYING BUSINESS MODEL

The business should consider the commercial scale it can achieve, if the scale is sufficient for the business to recover the initial capital investment e.g R&D, equipment and establishment cost; and whether it can achieve break-even profitability in a reasonable amount of time without the need for carbon credits revenue.

## COST-BENEFIT ANALYSIS

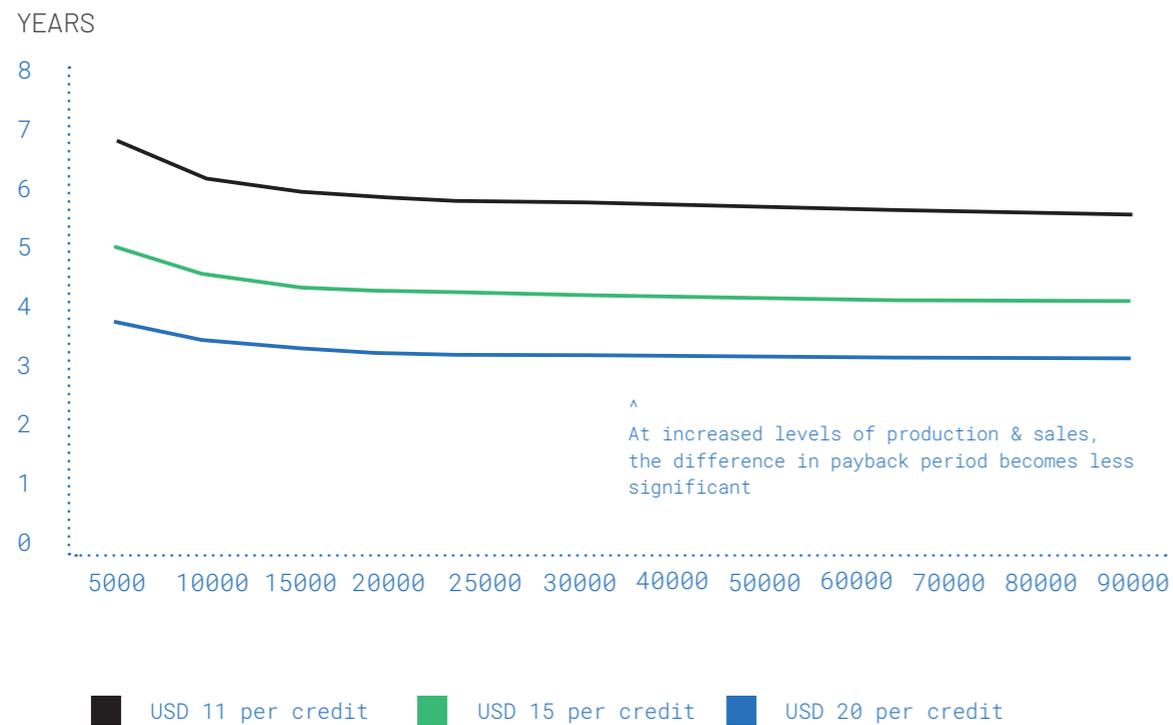
Beyond the economics of the underlying business, the registration of a carbon credit scheme can cost ~\$200K on average so it is important to consider whether the GHG emission reduction/avoidance can generate sufficient carbon credits revenue to justify this initial cost.

Scale is the most important consideration, and the required scale is unique to each business since different businesses have different underlying costs and revenue models. In addition, companies should consider the sustainability of projects over a > 10-year horizon.

Additionally, involvement in the carbon credits market demands a significant amount of time and effort and may necessitate a dedicated team to oversee the entire process.

## Scale is a vital consideration before pursuing carbon credits; larger projects yield higher profits and faster payback

PAYBACK PERIOD FROM VCM CARBON CREDIT SALES AGAINST NUMBER OF COOKSTOVES SOLD



On the EEP Africa website, we have added an [interactive tool](#) to assess the scale required and payback period for businesses to recoup the amounts spent in registration and access to the VCM.

Working assumptions for the tool can be altered to identify the implications for different levels of production, carbon credit sales and registration costs.

We have included additional resources to guide businesses on their engagement in the voluntary carbon credits market

**PRE-FINANCING OPTIONS:**

South Pole: [link](#)

**AGGREGATION/CONSOLIDATION ORGANIZATIONS:**

Ecometrix Africa: [link](#)  
Mirova Sunfunder: [link](#), [link](#).

**TECH PLATFORMS:**

4R Digital: [link](#)  
Carbon Clear: [link](#)

**CARBON CALCULATORS:**

Carbon Footprint: [link](#)  
Carbon Neutral: [link](#)



[eepafrica.org](http://eepafrica.org)