



UNLOCKING CLIMATE-CONSCIOUS DEVELOPMENT IN SUB-SAHARAN AFRICA – THE ROLE OF ARTICLE 6.2 AND AFCFTA IN A JUST ENERGY TRANSITION

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Abstract:

Sub-Saharan Africa (SSA) is simultaneously the least culpable for the climate problem and one of the most vulnerable to its repercussions. Despite these risks, SSA has enormous, untapped potential to contribute to global mitigation efforts thanks to its substantial natural capital—including the Congo Basin, the Sahel, and mangrove ecosystems—and significant renewable energy resources. The Paris Agreement's Article 6.2 mechanism provides an important opportunity for SSA countries to convert their mitigation potential into sustainable development financing, allowing SSA governments to monetize emission reductions from activities such as avoided deforestation, afforestation, agroforestry, clean cooking, and renewable energy deployment. In parallel, the African Continental Free Trade Area (AfCFTA), which includes 54 nations and 1.4 billion people, provides a supplementary framework for incorporating climate-conscious industry into Africa's overall economic integration drive. AfCFTA may standardize carbon requirements, open up cross-border renewable energy markets, and encourage green value chains like sustainable cement, electric transportation, and regional solar corridors. It also paves the door for a continental carbon market architecture in which African goals, rather than global buyer interests, determine the terms of involvement. This article contends that SSA may use the synergies between Article 6.2 procedures and the AfCFTA's integration framework to accomplish a fair, sovereign, and inclusive energy transition. By incorporating climate financing into Africa's development strategy, the continent has the potential to not only strengthen resilience and cut emissions but also to pioneer a unique form of climate-conscious growth that is both equitable and internationally significant.

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1. INTRODUCTION

Climate change has emerged as one of the most complicated and pressing collective action issues of the twenty-first century.¹ Unlike localized environmental concerns, its causes and consequences transcend national borders, rendering unilateral responses ineffective. Greenhouse gases (GHGs) released in one nation accumulate in the global atmosphere and contribute to climate change elsewhere, regardless of political boundaries.² This global commons dilemma raises the traditional free-riding challenge: individual governments may be hesitant to cut emissions when they may profit from others' mitigation initiatives without incurring their own expenses.³ As a result, effective climate action needs ongoing international cooperation, trustworthy governance structures, and equitable burden sharing.

International climate accords have attempted to address this quandary, progressing from top-down obligations in the Kyoto Protocol⁴ to a more decentralized, bottom-up approach in the Paris Agreement. The Paris Agreement, adopted in 2015 and is now ratified by 193 Parties, is based on nationally determined contributions (NDCs) and a flexible architecture that takes account of differing national capacities and responsibilities.⁵ While the Agreement represents a watershed moment in global climate governance, its success strongly depends on whether cooperative mechanisms - particularly those under Article 6 - can provide cost-

¹ United Nations, 'Climate Change' (UN 2025) <<https://www.un.org/en/global-issues/climate-change>> accessed 30 August 2025.

² World Meteorological Organization, 'Greenhouse Gases' (WMO 2025) <<https://wmo.int/topics/greenhouse-gases>> accessed 30 August 2025.

³ Anthony Patt, 'Beyond the tragedy of the commons: Reframing effective climate change governance' (2017) 34 *Energy Research & Social Science* 1-3.

⁴ Kyoto Protocol to the United Nations Framework Convention on Climate Change (adopted 11 December 1997, entered into force 16 February 2005) 2303 UNTS 162, arts 3-4.

⁵ Paris Agreement (adopted 12 December 2015, entered into force 4 November 2016) UN Doc FCCC/CP/2015/10/Add.1.

effective pathways for increased ambition, especially in developing countries with limited fiscal resources.

The climatic crisis stems from fossil-fuel-driven industrialization in wealthy countries.⁶ Coal, oil, and gas have powered industrial revolutions, urbanization, and technical advancement since the eighteenth century, but at the cost of increasing concentrations carbon dioxide and other GHG in the atmosphere.⁷ The resulting historical emissions profile reveals stark inequities: while the Global North is responsible for the vast majority of cumulative emissions, the Global South bears the brunt of climate impacts while contributing the least to the problem.⁸

This imbalance underpins the notion of common but differentiated responsibilities and respective capabilities (CBDR-RC), which remains central to international climate law.⁹ Developed countries not only bear historical responsibility for emissions, but also possess greater financial and technological capacity to respond. By contrast, many developing nations - particularly in Sub-Saharan Africa (SSA) - face significant trade-offs between poverty reduction, industrialization, and climate action. Recognizing this historical and structural mismatch is essential for designing climate governance mechanisms that reduce emissions while supporting equitable development pathways. Africa illustrates this tension most clearly. Sub-Saharan Africa contributes approximately 2.8 per cent of historical global emissions and less than 4 per cent of current annual

⁶ Olivia Nater, 'Study: World's Richest Are Driving Climate Catastrophes (Population Connection, 15 May 2025) <<https://populationconnection.org/blog/study-worlds-richest-are-driving-climate-catastrophes/>> accessed 30 August 2025.

⁷ LJR Nunes, 'The Rising Threat of Atmospheric CO₂: A Review on the Causes, Impacts, and Mitigation Strategies' (2023) 10 *Environments* 66.

⁸ Generation Climate Europe, 'Global North and Global South: How Climate Change Uncovers Global Inequalities' (Generation Climate Europe, 10 May 2022) <<https://gceurope.org/global-north-and-global-south-how-climate-change-uncovers-global-inequalities/>> accessed 30 August 2025.

⁹ Tian Wang and Xiang Gao, 'Reflection and Operationalization of the Common but Differentiated Responsibilities and Respective Capabilities Principle in the Transparency Framework under the International Climate Change Regime' (2018) 9 *Advances in Climate Change Research* 253.

emissions, yet it is among the regions most vulnerable to climate change.¹⁰ This vulnerability reflects structural reliance on climate-sensitive sectors such as rain-fed agriculture, fisheries, and pastoralism, compounded by weak health systems, rapid urbanization, and inadequate infrastructure.¹¹ Estimates show that climate change is expected to reduce the continent's GDP per capita growth by up to 15% by 2050 if left unmitigated.¹² Coastal states face mounting threats to ecosystems such as mangroves and coral reefs, which provide both livelihoods and natural protection while climate stress interacts with political fragility, food insecurity, and migratory pressures, exacerbating regional instability.

At the same time, SSA possesses considerable mitigating potential. Its natural capital - including the Congo Basin, the world's second-largest tropical rainforest, the Sahel's Great Green Wall initiative, and extensive mangrove ecosystems - has the capacity to sequester significant volumes of carbon dioxide.¹³ The region's renewable energy endowment -solar, wind, hydro, and geothermal -is largely untapped, with estimates suggesting that between 30-60 percent of this potential could be deployed at competitive cost.¹⁴ The paradox positions SSA as simultaneously one of

¹⁰ Intergovernmental Panel on Climate Change (IPCC), 'Africa' in *Climate Change 2022: Impacts, Adaptation and Vulnerability* (Sixth Assessment Report of the IPCC, 2022), Chapter 9.

¹¹ Rodolfo Maino and Drilona Emrullahu, 'Climate Change in Sub-Saharan Africa Fragile States: Evidence from Panel Estimations' (IMF Working Paper No. 2022/054) <<https://doi.org/10.5089/9798400204869.001>> accessed 26 February 2026.

¹² African Development Bank and Amundi, Time for action: Unlocking climate finance in Africa (ESG Thema #13, AfDB and Amundi 2022) 4 <<https://research-center.amundi.com/article/esg-thema-13-time-action-unlocking-climate-finance-africa>> accessed 2 April 2026.

¹³ David O'Connor and James Ford, 'Increasing the Effectiveness of the "Great Green Wall" as an Adaptation to the Effects of Climate Change and Desertification in the Sahel' (2014) 6 Sustainability 7142-7154.

¹⁴ Charity M. Nkinyam and others, 'Exploring Geothermal Energy as a Sustainable Source of Energy: A Systemic Review' (2025) 6 Unconventional Resources 100149.

the least responsible for climate change, among the most vulnerable to its impacts, and one of the most promising contributors to global mitigation.

Given these conditions, SSA's engagement with the global climate agenda cannot be defined only in terms of emission reductions. For a region marked by widespread poverty, infrastructure deficits, and pressing development demands, climate action must coexist with socioeconomic advancement. The concept of a just transition captures this imperative, emphasizing a shift to a low-carbon future that protects livelihoods, promotes equity, and avoids reproducing structural inequalities.¹⁵ In practice, this requires that policies promoting renewable energy, sustainable land use, or carbon markets generate local employment, facilitate technology transfer, and deliver tangible community benefits. It also requires safeguards to ensure that climate finance and carbon revenues support adaptation, public services, and resilience-building, rather than being captured by external actors or domestic elites. This fair transition perspective necessitates integrating climate action with Africa's larger development frameworks, such as the African Union's Agenda 2063 and the United Nations Sustainable Development Goals (SDGs).¹⁶

This dual climate-development responsibility complicates policy formulation but also creates strategic opportunities. Cooperative mechanisms under the Paris Agreement – particularly Article 6.2 – together with regional integration initiatives such as the African Continental Free Trade Area (AfCFTA), offer pathways for embedding climate action within Africa's broader development agenda. Article 6.2 allows countries to generate and transfer internationally transferable mitigation outcomes (ITMOs), enabling them to monetize verified emissions reductions through bilateral or multilateral cooperation. For SSA countries with substantial mitigation potential but limited access to

¹⁵ Anasuya Halder, and Narayan Sethi, *Reconciling Energy Poverty and Climate Change: Universal Energy Access and Net-Zero Emission* (Springer 2025) 173–204.

¹⁶ African Peer Review Mechanism, 'Agenda 2063 and SDGs Implementation in Africa' (African Union 2021) <<https://www.unsouthsouth.org/wp-content/uploads/2021/03/Agenda-2063-and-SDGs-Implementation-in-Africa.pdf>> accessed 30 August 2025.

finance, this mechanism offers a means of attracting climate-aligned investment while retaining national discretion over project design and authorization.

In parallel, AfCFTA provides an institutional platform for aligning trade liberalization with climate-conscious industrialization. By facilitating regulatory convergence, cross-border energy markets, and regional value chains, AfCFTA creates opportunities to integrate sustainability into Africa's economic transformation. When strategically combined, Article 6.2 and AfCFTA have the potential to anchor a distinctively African model of climate-conscious development - one that balances mitigation and adaptation while advancing economic integration, sovereignty, and equity.

This article investigates how Sub-Saharan Africa can leverage international climate cooperation mechanisms and continental trade frameworks to advance an equitable and inclusive energy transition. It focuses on two linked opportunities: first, Article 6.2 of the Paris Agreement to unlock climate finance through the generation and transfer of internationally traded mitigation outcomes (ITMOs); and second, the role of AfCFTA in harmonizing carbon standards, facilitating cross-border green trade, and supporting the emergence of regional carbon markets. The central argument is that, when strategically aligned, these instruments can accelerate renewable energy deployment, integrate sustainability into industrialization, and ensure fair benefit-sharing while preserving national sovereignty.

The article adopts a doctrinal and policy-oriented methodology, drawing on academic literature, international climate instruments, and selected case studies of emerging SSA initiatives, including bilateral ITMO arrangements, regional renewable energy programmes, and pilot carbon market frameworks. It is structured in seven sections. Following this introduction, section 2 examines Sub-Saharan Africa's emissions profile, climate vulnerability, and mitigation potential. Section 3 outlines the international climate governance framework, focusing on the Paris Agreement and the operation of Article 6.2. Section 4 analyses the opportunities and challenges of Article 6.2 for Sub-Saharan Africa, including mitigation monetization, revenue generation, and development

co-benefits. Section 5 examines the role of the AfCFTA in supporting climate-conscious industrialization, regional energy integration, and the development of green value chains. Section 6 addresses governance, equity, and justice concerns, including sovereignty, benefit-sharing, and risks of carbon colonialism. Section 7 concludes.

2. AFRICA'S CONTRIBUTION TO CLIMATE CHANGE AND MITIGATION POTENTIAL

Sub-Saharan Africa (SSA) is one of the regions least responsible for the global climate crisis, both historically and in the present.¹⁷ According to data from the Global Carbon Project, SSA has contributed approximately 2.8 per cent of cumulative global greenhouse gas (GHG) emissions and currently accounts for around 3.8 per cent of annual global emissions.¹⁸ In contrast, the United States and the European Union together are responsible for more over 40 per cent of historical emissions, reflecting the legacy of fossil-fuel-driven industrialization in the Global North.¹⁹ Per capita emissions in SSA remain among the lowest in the world, averaging less than 1.1 tonnes of CO₂ equivalent per year, compared with approximately 15 tonnes in North America.²⁰

This disparity illustrates the fundamental injustice of the global climate crisis: SSA contributes minimally to global emissions yet faces disproportionate exposure to climate impacts. Structural factors, including widespread energy poverty, limited industrialization, and continued reliance on traditional biomass for household energy, mean that Africa's emissions profile is unlikely to rise significantly in the near term, provided

¹⁷ Rodolfo Maino and Drilona Emrullahu (n 11).

¹⁸ Pierre Friedlingstein and others, 'Global Carbon Budget 2023' (2023) 15 *Earth System Science Data* 5301–5369.

¹⁹ Eos, 'Global North Is Responsible for 92% of Excess Emissions' (Eos, 28 October 2020) <<https://eos.org/articles/global-north-is-responsible-for-92-of-excess-emissions>> accessed 30 August 2025

²⁰ Ibid; Rodolfo Maino and Drilona Emrullahu (n 11).

development follows clean pathways supported by adequate finance and technology.²¹

Despite its limited contribution to global emissions, SSA is highly vulnerable to climate change. Agriculture is particularly exposed, with more than 60 per cent of the population dependent on smallholder, rain-fed farming. Erratic rainfall, prolonged droughts, and extreme weather events threaten staple crops such as maize, millet, and sorghum, while pastoralist livelihoods are undermined by reduced water and grazing availability.²² Climate change also poses significant public health risks, as shifting temperature and rainfall patterns expand the range of vector-borne diseases such as malaria, while urban heat stress worsens health outcomes in rapidly growing cities characterized by inadequate infrastructure.²³

Infrastructural weaknesses further compound these vulnerabilities. Housing, transport networks, and energy systems across much of SSA are poorly equipped to withstand floods, heatwaves, and extreme weather events, while urban centers often lack adequate drainage and planning capacity. These climate stresses intersect with broader development challenges, including food insecurity, population growth, and political fragility, particularly in regions such as the Sahel, where environmental degradation, resource scarcity, and insecurity are increasingly interlinked.²⁴

At the same time, SSA possesses substantial mitigation potential rooted in its natural capital. The Congo Basin, the world's second-largest tropical rainforest, sequesters approximately 1.2 billion tonnes of CO₂ annually while supporting biodiversity and local livelihoods.²⁵ The African Union's

²¹ Ibid.

²² IPPC (n 10)

²³ United Nations, 'Climate Change' (UN, 2025) <<https://www.un.org/en/global-issues/climate-change>> accessed 30 August 2025.

²⁴ Ibid.

²⁵ World Economic Forum, 'The Democratic Republic of Congo to create the Earth's largest protected tropical forest reserve' (World Economic Forum, 22 January 2025) <<https://www.weforum.org/stories/2025/01/congo-kivu-kinshasa-green-corridor/>> accessed 30 August 2025.

Great Green Wall initiative aims to restore 100 million hectares of degraded land across the Sahel region by 2030, with potential to sequester up to 250 million tonnes of CO₂ and create millions of jobs.²⁶ Coastal ecosystems, including mangroves in the Niger Delta and along the coast of Mozambique and Senegal, provide high-density carbon storage while also protecting communities from storm surges and sustaining fisheries.²⁷ Agroforestry systems further enhance mitigation by integrating trees into agricultural landscapes, improving soil fertility, and increasing resilience to climate shocks.

In addition to its natural capital, SSA's development trajectory presents an opportunity to avoid carbon-intensive growth pathways.²⁸ Clean cooking technologies illustrate this potential. Traditional biomass use contributes to deforestation, GHG emissions, and severe indoor air pollution, with disproportionate impacts on women and children. Transitioning to alternatives such as liquefied petroleum gas, bioethanol, or electric cooking can deliver significant health, environmental, and gender equity benefits while generating measurable emissions reductions.²⁹ Transitioning to alternatives like liquefied petroleum gas (LPG), bioethanol, or electric stoves can deliver significant health, environmental, and gender equity benefits while generating measurable emissions reductions. Ghana's bilateral ITMO agreement with Switzerland under Article 6.2 demonstrates how clean cooking programmes can generate marketable mitigation outcomes while improving household welfare.

Renewable energy represents another critical opportunity. SSA possesses some of the world's highest solar irradiation levels, alongside substantial wind, hydro, and geothermal resources. Yet an estimated 30 to 60 per cent

²⁶ UN Convention to Combat Desertification, 'Great Green Wall Initiative' (UNCCD 2026) <<https://www.unccd.int/our-work/ggwi>> accessed 30 August 2025.

²⁷ Reshma Sunkur and others, 'Mangroves' role in supporting ecosystem-based techniques to reduce disaster risk and adapt to climate change: A review' (2023) 196 *Journal of Sea Research* 102449.

²⁸ Rodolfo Maino and Drilona Emrullahu (n 11).

²⁹ Anthony Patt (n 3) 1-3.

of this renewable potential remains untapped.³⁰ Off-grid solar systems and mini-grids offer cost-effective solutions for rural electrification, particularly for the more than 500 million people in SSA who currently lack access to electricity. Large-scale projects, such as wind developments in Kenya's Turkana Corridor, further illustrate the region's capacity to deploy clean energy at scale.³¹

Quantitative assessments underscore the scale of Africa's mitigating potential. Full implementation of the Great Green Wall could sequester up to 250 million tonnes of CO₂ by 2030.³² The Africa Carbon Markets Initiative (ACMI), launched at COP27, estimates that African carbon markets could reduce emissions by up to 2.4 billion tonnes annually by 2030, equivalent to approximately 4.4 per cent of global emissions.³³ Forestry and land use activities account for a significant share of this potential, though renewable energy, agriculture, and waste management also have substantial opportunities.

Despite this promise, significant barriers remain. Financing is a primary constraint: between 2000 and 2020, Africa received approximately just 2 per cent of global renewable energy investment, with the majority going to North Africa rather than SSA.³⁴ High borrowing costs, perceived investment risks, and limited fiscal space continue to deter private capital.

³⁰ IRENA and AfDB, *Renewable Energy Market Analysis: Africa and Its Regions* (International Renewable Energy Agency and African Development Bank, 2002) <<https://www.irena.org/publications/2022/Jan/Renewable-Energy-Market-Analysis-Africa>> accessed 26 February 2026; Temidayo Alex-Oke and others, *Renewable energy market in Africa: Opportunities, progress, challenges, and future prospects* (2025) 59 *Energy Strategy Reviews* 101700.

³¹ *Ibid.*

³² UN Convention to Combat Desertification, 'Great Green Wall Initiative' (UNCCD, 2025) <<https://www.unccd.int/our-work/ggwi>> accessed 30 August 2025.

³³ Global Energy Alliance for People and Planet, 'Africa Carbon Markets Initiative Builds on Momentum from COP27, Announces 13 Action Programs' (16 January 2023) <<https://energyalliance.org/acmi-adsw/>> accessed 30 August 2025.

³⁴ Rabia Ferroukhi and others 'Africa's Renewable Energy Transition Has Socio-Economic Benefits' (World Economic Forum, 9 September 2022) <<https://www.weforum.org/stories/2022/09/renewables-energy-transition-africa-jobs/>> accessed 30 August 2025.

Institutional capacity constraints further limit participation, as many SSA countries lack the technical and administrative systems required to design, implement, and monitor complex mitigation and carbon market initiatives.³⁵ Robust monitoring, reporting, and verification (MRV) frameworks remain underdeveloped. Governance challenges, including risks of corruption and elite capture, also raise concerns regarding equitable benefit-sharing.

Sub-Saharan Africa's role in the global climate system is therefore characterized by a persistent paradox. The region contributes little to global emissions yet faces severe climate impacts, while simultaneously possessing vast untapped mitigation potential in its natural capital and renewable resources. Initiatives such as the Great Green Wall, the Africa Carbon Markets Initiative, and emerging bilateral ITMO agreements illustrate possible pathways forward. However, without addressing financial, institutional, and governance constraints, this potential will remain largely unrealized.

3. THE PARIS AGREEMENT AND COOPERATIVE MECHANISMS

Over the past three decades, international climate governance has evolved through a series of multilateral agreements aimed at coordinating state responses to climate change.³⁶ The Kyoto Protocol, adopted in 1997, represented the first attempt to establish a legally binding framework requiring developed countries to reduce greenhouse gas (GHG) emissions.³⁷ Its architecture reflected the principle of common but differentiated responsibilities, imposing quantified emissions reduction targets on Annex I Parties while exempting developing countries,

³⁵ Rodolfo Maino and Drilona Emrullahu (n 11).

³⁶ Daniel Bodansky, Jutta Brunnée and Lavanya Rajamani, *International Climate Change Law* (Oxford University Press 2017) 34–36.

³⁷ Kyoto Protocol to the United Nations Framework Convention on Climate Change (adopted 11 December 1997, entered into force 16 February 2005) 2303 UNTS 162, arts 3–4.

including those in Sub-Saharan Africa (SSA), from binding mitigation obligations.³⁸

While normatively grounded in historical responsibility, the Kyoto framework was limited in both participation and effectiveness. Major emitters either failed to ratify the Protocol or withdrew from it, and the rigid division between developed and developing countries constrained broader engagement.³⁹ The Clean Development Mechanism (CDM), introduced under Kyoto, enabled emissions-reduction projects in developing countries to generate tradable credits.⁴⁰ However, Africa accounted for a small share of registered CDM projects, reflecting structural barriers such as limited institutional capacity, high transaction costs, and restrictive eligibility rules, including the exclusion of avoided deforestation activities.⁴¹

In response to these shortcomings, the Paris Agreement, adopted in 2015 at COP21, established a more flexible and inclusive framework for global climate action.⁴² Its central objective is to hold the increase in global average temperature well below 2°C above pre-industrial levels, while pursuing efforts to limit warming to 1.5°C.⁴³ Unlike the Kyoto Protocol, the Paris Agreement does not impose top-down emissions targets. Instead, all Parties are required to submit nationally determined contributions (NDCs) outlining their mitigation and adaptation objectives, reflecting national circumstances and capacities.⁴⁴ This bottom-up architecture

³⁸ Lavanya Rajamani, *Differential Treatment in International Environmental Law* (Oxford University Press 2006) 122–125.

³⁹ Joanna Depledge, ‘Against the Grain: The United States and the Global Climate Change Regime’ (2001) 17 *Global Change, Peace & Security* 11.

⁴⁰ United Nations Framework Convention on Climate Change, *Clean Development Mechanism (CDM) – Overview* (UNFCCC) <<https://unfccc.int/process-and-meetings/the-kyoto-protocol/mechanisms-under-the-kyoto-protocol/the-clean-development-mechanism>> accessed 5 March 2026.

⁴¹ Axel Michaelowa and Katharina Michaelowa, ‘Climate Business for Poverty Reduction? The Role of the World Bank’ (2007) 16 *Review of World Economics* 259, 267–270.

⁴² Paris Agreement (adopted 12 December 2015, entered into force 4 November 2016) UN Doc FCCC/CP/2015/10/Add.1.

⁴³ Intergovernmental Panel on Climate Change (IPCC), *Global Warming of 1.5°C* (IPCC Special Report 2018) 96–101.

⁴⁴ Paris Agreement (n 42) art 4(2) – (3).

broadened participation and political buy-in, including from developing countries.⁴⁵

The principle of common but differentiated responsibilities and respective capacities (CBDR-RC) remains embedded within the Paris framework, though in a more nuanced form.⁴⁶ While all Parties are expected to contribute to mitigation efforts, the Agreement recognises differing national responsibilities and capacities, particularly with respect to finance, technology transfer, and capacity-building.⁴⁷ For SSA countries, which account for a small share of global emissions yet face acute climate vulnerability, this structure provides both flexibility and access to international support mechanisms.

Beyond NDCs, the Paris Agreement incorporates provisions for international cooperation, recognizing that collaborative approaches can lower mitigation costs and enhance ambition.⁴⁸ These cooperative mechanisms are set out in Article 6, which establishes three distinct pathways: market-based cooperation under Articles 6.2 and 6.4, and non-market approaches under Articles 6.8 and 6.9.⁴⁹ Article 6 is premised on the idea that enabling countries to cooperate across borders, rather than act in isolation, can facilitate more efficient and equitable climate action.

Article 6.2 establishes a decentralized framework for voluntary cooperation through the generation and transfer of internationally transferable mitigation outcomes (ITMOs).⁵⁰ Under this mechanism, two or more Parties may enter into bilateral or multilateral agreements to implement emissions-reduction activities, with verified mitigation outcomes transferred from the host country to the acquiring country for

⁴⁵ Rodolfo Maino and Drilona Emrullahu (n 11).

⁴⁶ Tian Wang and Xiang Gao (n 9) 263.

⁴⁷ Lavanya Rajamani, 'The 2015 Paris Agreement: Interplay Between Hard, Soft and Non-Obligations' (2016) 28 *Journal of Environmental Law* 337, 340–342.

⁴⁸ Paris Agreement (n 42) art 6(1).

⁴⁹ Ibid arts 6.2, 6.4, 6.8.

⁵⁰ United Nations Framework Convention on Climate Change, *Article 6.2 Cooperative Approaches* (UNFCCC) <<https://unfccc.int/process-and-meetings/the-paris-agreement/article-6/article-6-2>> accessed 5 March 2026.

use toward its NDC, subject to corresponding adjustments to avoid double counting.⁵¹ This decentralized structure allows Parties to tailor cooperative arrangements to their specific needs and priorities, without requiring centralized approval by the UNFCCC.⁵²

For Sub-Saharan Africa, Article 6.2 is particularly significant. The region possesses substantial mitigation potential in areas such as forestry, agriculture, renewable energy, and clean cooking, yet faces persistent constraints in accessing climate finance.⁵³ Article 6.2 provides a mechanism for monetizing verified emissions reductions, enabling SSA countries to attract investment while retaining sovereignty over project selection and authorization.⁵⁴ Unlike the CDM, Article 6.2 does not exclude avoided deforestation or other land-use activities, thereby expanding the scope of eligible mitigation actions.

Emerging practice confirms that Article 6.2 cooperation in Sub-Saharan Africa is no longer hypothetical. Early bilateral agreements – including Ghana’s clean cooking partnership with Switzerland,⁵⁵ Rwanda’s forestry-based carbon trading pilots,⁵⁶ Senegal’s biogas cooperation with Sweden,⁵⁷ and Kenya’s agroforestry initiatives building on prior carbon market

⁵¹ Michael A. Mehling, Gilbert E. Metcalf, Robert N. Stavins, ‘Linking Heterogeneous Climate Policies (Consistent with the Paris Agreement)’ (2018) 48 *Environmental Law* 647, 650–652.

⁵² KliK Foundation, *First ITMO Transfer: Switzerland–Ghana* (KliK Foundation, 7 July 2025).
<https://www.klik.ch/en/news/news-article/first-itmo-transfer-switzerland-ghana> accessed 30 August 2025.

⁵³ African Development Bank, *Climate and Green Growth Strategic Framework: Projecting Africa’s Voice - Strategy 2021–2030* (AfDB 2021) 18–20.

⁵⁴ Charlotte Streck, ‘The Paris Agreement: A New Beginning’ (2016) 24 *Review of European, Comparative & International Environmental Law* 32, 35–37.

⁵⁵ KliK Foundation (n 52).

⁵⁶ Rwanda Ministry of Environment, *Initial Article 6 Readiness Reports (2022–2024)* (31 December 2024)
<https://unfccc.int/sites/default/files/resource/Rwanda%20Initial%20Report%20%202024%20final.pdf> accessed 30 August.

⁵⁷ Swedfund, ‘Biofuels, Senegal’ (*Swedfund*, 13 March 2025)
<https://www.swedfund.se/en/investments-and-projects/biofuels-senegal> accessed 30 August 2025.

experience⁵⁸ – demonstrate growing operational readiness across diverse sectors. These initiatives illustrate how ITMOs can support renewable energy deployment, nature-based solutions, and household-level mitigation while generating development co-benefits. At the same time, they reveal recurring governance challenges relating to MRV capacity, benefit-sharing, and long-term sovereignty over mitigation outcomes.⁵⁹ The experiences to date therefore reinforce both the economic promise and institutional risks of Article 6.2 engagement in the African context.

Article 6.4 complements this decentralized approach by establishing a more centralized crediting mechanism under the authority of the UNFCCC.⁶⁰ Drawing on elements of the CDM, Article 6.4 creates a supervised system through which eligible projects and programmes can generate tradable emission reductions, subject to uniform methodologies and verification standards.⁶¹ While this framework offers enhanced consistency and environmental integrity, it may also entail higher transaction costs and longer approval processes, posing challenges for countries with limited institutional capacity.⁶²

In addition to market-based mechanisms, Articles 6.8 and 6.9 provide for non-market approaches, including cooperation on technology transfer, capacity-building, and policy coordination.⁶³ These approaches are particularly relevant for adaptation and resilience-building initiatives that

⁵⁸ International Small Group and Tree Planting Program (TIST), *About TIST Kenya* (2025) <<https://program.tist.org/kenya>> accessed 30 August 2025.

⁵⁹ UNFCCC, *Guidance on Cooperative Approaches under Article 6.2* (Decision 2/CMA.3, 2021), paras 29–37 <<https://unfccc.int/documents/636314>> accessed 30 August 2025; World Bank, *State and Trends of Carbon Pricing* (World Bank 2023) <<https://hdl.handle.net/10986/37455>> accessed 30 August 2025.

⁶⁰ Paris Agreement (n 42) art 6.4.

⁶¹ United Nations Framework Convention on Climate Change, *Article 6.4 Mechanism – Rules, Modalities and Procedures* (UNFCCC Decision 3/CMA.3, 2021) paras 1–5.

⁶² L. Schneider and S. La Hoz Theuer, ‘Environmental Integrity of International Carbon Market Mechanisms under the Paris Agreement’ (2019) 19(3) *Climate Policy* 386; Michael Mehling, ‘Governing Cooperative Approaches under the Paris Agreement’ (2019) 46 *Ecology Law Quarterly* 765.

⁶³ UNFCCC, *Framework for Non-Market Approaches under Article 6.8* (Decision 4/CMA.3, 2021).

do not produce quantifiable emissions reductions suitable for trading. For SSA countries, non-market approaches may complement market-based mechanisms by addressing structural vulnerabilities and strengthening domestic capacities.⁶⁴

SSA's position within the Paris framework is therefore both enabling and precarious. On the one hand, the region's low emissions profile affords flexibility in mitigation commitments and access to international support. On the other hand, effective participation in Article 6 mechanisms requires robust monitoring, reporting, and verification systems, clear legal frameworks, and institutional capacity to manage complex transactions.⁶⁵ Without these safeguards, there is a risk that SSA countries may capture only limited value from cooperative mechanisms or become dependent on external actors.⁶⁶

In summary, the Paris Agreement represents a shift toward a more inclusive and cooperative model of climate governance. For Sub-Saharan Africa, Article 6 – particularly Article 6.2 – offers a pathway to translate mitigation potential into development finance, while Articles 6.4 and 6.8 provide complementary avenues for engagement. The challenge lies in ensuring that participation in these mechanisms supports national development objectives, maintains environmental integrity, and advances the broader goal of a just and equitable energy transition.⁶⁷

⁶⁴ Navroz Dubash and others, 'National Climate Institutions Complement Targets and Policies' (2021) 374 *Science* 690.

⁶⁵ African Development Bank (n 53) 24–27; World Bank, *Building Monitoring, Reporting, and Verification Systems and Their Application in Future Carbon Markets* (World Bank 2022) <<https://openknowledge.worldbank.org/entities/publication/65c60731-7b65-5ab6-a083-9c4243183607>> accessed 26 February 2026.

⁶⁶ Michaelowa and Michaelowa (n 41) 272–275; Transparency International, *Corruption Risks in Climate Finance* (TI, 2021) <<https://www.transparency.org/en/blog/corruption-and-climate-finance-risks-facing-energy-transition-initiatives-cop29>> accessed 26 February 2026.

⁶⁷ Daniel Bodansky, Jutta Brunnée and Lavanya Rajamani (n 36) 312–315.

4. UNLOCKING OPPORTUNITIES FOR SSA UNDER ARTICLE 6.2

The implementation of Article 6.2 of the Paris Agreement represents a watershed moment for developing countries such as Sub-Saharan Africa (SSA). Article 6.2 opens new opportunities for SSA governments to monetise their mitigation potential while also advancing development and adaptation objectives by enabling the generation and transfer of internationally traded mitigation outcomes (ITMOs).⁶⁸ For a continent endowed with massive natural capital and abundant renewable energy resources, yet constrained by limited finance and technology, Article 6.2 provides a framework for linking global demand for cost-effective emissions reductions with Africa's largely untapped mitigation supply.⁶⁹ However, realizing this potential requires careful planning, strong institutions, and safeguards to ensure that climate finance supports equitable and sustainable development.⁷⁰

4.1 Monetizing natural capital

One of SSA's most valuable assets in the carbon economy is its natural capital. The region is home to the Congo Basin, mangrove-rich coasts, huge drylands in the Sahel, and extensive opportunities for agroforestry and regenerative agriculture.⁷¹ These ecosystems constitute some of the world's largest underutilized carbon sinks. Article 6.2 allows countries to monetize emissions reductions and removals resulting from the

⁶⁸ UNFCCC, 'Guidance on Cooperative Approaches Referred to in Article 6.2' (Decision 2/CMA.3, Glasgow Climate Pact, 2021) paras 2–7 <<https://unfccc.int/documents/636314>> accessed 30 August 2025.

⁶⁹ Michael Mehling, Gilbert Metcalf and Robert Stavins (n 51) 650–652; World Bank, *State and Trends of Carbon Pricing 2023* (World Bank 2023) 44–46, 92–94.

⁷⁰ Charlotte Streck (n 54) 7–9.

⁷¹ FAO, *The State of the World's Forests 2022: Forest Pathways for Green Recovery* (FAO 2022) 18–22, 45–47.

protection, restoration, and sustainable management of natural ecosystems.⁷²

Avoided deforestation represents a particularly significant opportunity. Estimates suggest that deforestation in Africa generates approximately 1.57 billion tonnes of CO₂ annually.⁷³ Even modest reductions in deforestation could therefore yield substantial mitigation benefits. Under the Kyoto Protocol, however, the Clean Development Mechanism (CDM) excluded avoided deforestation from eligible activities, significantly limiting African participation.⁷⁴ By contrast, Article 6.2 permits emissions reductions from averted deforestation to be transferred as ITMOs, creating a new revenue stream for African countries. Reducing deforestation and compensating people for lost firewood, charcoal, or agricultural expansion entails relatively low opportunity cost, estimated at between USD 2 and 13 per tonne of CO₂.⁷⁵ At ITMO prices comparable to those contracted by Switzerland's Klik Foundation (approximately USD 22.79 per tonne), a 10 per cent reduction in annual deforestation could generate around USD 1.5 billion in net revenue per year.⁷⁶ At higher ambition levels, and with projected ITMO prices of USD 80-90 by 2030, potential revenues could rise to tens of billions of dollars annually.⁷⁷

Beyond avoided deforestation, regeneration and afforestation offer additional pathways. Africa has lost more than 20 per cent of its tropical

⁷² UNFCCC, Article 6 Implementation Guidance (2021) paras 20–26 <<https://unfccc.int/process-and-meetings/the-paris-agreement/article6>> accessed 30 August 2025.

⁷³ Pierre Friedlingstein and others, 'Global Carbon Budget 2023' (2023) 15 Earth System Science Data 5301, 5318–5322; Georg Kindermann and others, 'Global cost estimates of reducing carbon emissions through avoided deforestation' (2008) 105(30) PNAS U S A 10302–10307.

⁷⁴ UNFCCC, 'Clean Development Mechanism Rules' (Decision 3/CMP.1, 2005) paras 1–5.

⁷⁵ Jonah Busch and Jens Engelmann, 'Cost-effectiveness of reducing emissions from tropical deforestation, 2016–2050' (2018) 13 Environmental Research Letters 015001, 5–7.

⁷⁶ Chloe Jardine, *Switzerland expects falling costs for ITMOs* (Argus Media, 26 June 2024) <<https://www.argusmedia.com/en/news-and-insights/latest-market-news/2581802-switzerland-expects-falling-costs-for-itmos>> accessed 30 August 2025.

⁷⁷ World Bank, *State and Trends of Carbon Pricing 2023* (World Bank 2023) 64–66.

forests since 1900, leaving extensive areas suitable for restoration.⁷⁸ National initiatives, such as Kenya's commitment to plant 15 billion trees by 2050, reflect growing political momentum for large-scale restoration.⁷⁹ Reforestation and agroforestry in Africa's humid zones can sequester an estimated 10–17 tonnes of CO₂ per hectare per year.⁸⁰ At scale, such efforts could remove close to one billion tonnes of CO₂ annually, equivalent to 1.7 per cent of global emissions.⁸¹ Although reforestation typically involves higher upfront costs than avoided deforestation, ITMO prices above USD 20 per tonne render such projects economically viable.⁸²

Mangrove ecosystems further enhance Africa's mitigation potential. African mangroves can store up to four times more carbon per hectare than terrestrial forests, while simultaneously strengthening coastal resilience and supporting fisheries-based livelihoods.⁸³ Restoring damaged mangroves in countries such as Mozambique, Nigeria, and Senegal could therefore generate significant ITMO revenues alongside adaptation benefits. Regenerative agriculture practices – including conservation tillage, biochar application, and crop rotation – also increase soil organic carbon stocks, enhancing food security while producing tradable emissions reductions.⁸⁴ Taken together, natural capital-based solutions

⁷⁸ FAO (n 71) 39–41.

⁷⁹ Government of Kenya, *National Tree Growing Programme (NTGP)* (Ministry of Environment 2022) 4–8; Ennia Bosshard, 'Kenya's goal to plant 15 billion trees should include farmers – study shows they are keen' (The Conversation Africa, 25 February 2025) <<https://theconversation.com/kenyas-goal-to-plant-15-billion-trees-should-include-farmers-study-shows-they-are-keen-249518>> accessed 30 August 2025.

⁸⁰ Bronson Griscom and others, 'Natural Climate Solutions' (2017) 114 PNAS 11645, 11647–11649.

⁸¹ Ibid; IPCC, AR6 Working Group III: Mitigation of Climate Change (Cambridge University Press 2022) ch 7, 817–820.

⁸² World Bank, *Nature-Based Solutions for Climate Resilience in the World Bank Portfolio* (World Bank 2023) 28–30 <<https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099150503202338102>> accessed 5 March 2026.

⁸³ Reshma Sunkur and others, 'Mangroves' role in supporting ecosystem-based techniques to reduce disaster risk and adapt to climate change: A review' (2023) 196 Journal of Sea Research 102449; Daniel Donato and others, 'Mangroves among the Most Carbon-Rich Forests in the Tropics' (2011) 4 Nature Geoscience 293, 294–296.

⁸⁴ Cristina I. Dias Rodrigues and others, 'Soil Carbon Sequestration in the Context of Climate Change Mitigation: A Review' (2023) 7 Soil Systems 64; Lal Rattan, 'Soil Carbon

represent some of the most cost-effective and socially beneficial avenues for SSA participation in Article 6.2 carbon markets.

4.2 Renewable energy potential

Natural capital is not the only pathway for monetizing mitigation under Article 6.2. SSA possesses vast, largely untapped renewable energy resources, including some of the world's highest solar irradiation levels, strong wind corridors, and significant geothermal and hydroelectric potential.⁸⁵ Despite this endowment, the International Renewable Energy Agency (IRENA) estimates that between 30 and 60 per cent of Africa's renewable energy potential remains undeveloped.⁸⁶

Harnessing these resources could alleviate Africa's chronic energy poverty while contributing to global mitigation. In 2019, approximately 569 million people in SSA lacked access to electricity, representing nearly three-quarters of the global population.⁸⁷ Expanding solar mini-grids, utility-scale wind farms, and geothermal generation would displace fossil fuels, reduce emissions, and enhance energy security. Halving fossil fuel emissions from Africa's power sector by 2030 could generate ITMO revenues of approximately USD 13.5 billion annually at current prices, rising to USD 47 billion under higher projected price scenarios.⁸⁸

Financing, however, remains a major barrier. Between 2000 and 2020, Africa received only around 2 per cent of global renewable energy investment, with majority of it concentrated in North Africa.⁸⁹ Fiscal constraints, perceived investment risks, and high borrowing costs continue to deter private capital in SSA. Article 6.2 can help close this financial gap by providing predictable revenue streams from ITMO sales.⁹⁰

Sequestration Impacts on Global Climate Change and Food Security' (2004) 304 *Science* 1623, 1625–1627.

⁸⁵ IRENA and AfDB (n 30) 11–14, 37–41.

⁸⁶ *Ibid.*, 18–21.

⁸⁷ International Energy Agency, *Africa Energy Outlook 2022* (IEA 2022) 31–33.

⁸⁸ IRENA and AfDB (n 30) 40–44.

⁸⁹ International Energy Agency (n 87) 58–60; World Economic Forum, *Why Africa Is Missing Out on Renewable Energy Investment* (WEF 2022) 2–4.

⁹⁰ Michael Mehling, Gilbert Metcalf and Robert Stavins (n 51) 650–652.

Mechanisms such as advance purchase agreements or results-based payments by developed-country buyers can reduce project risk, lower financing costs, and accelerate deployment. In this way, ITMO revenues may serve as a catalyst for unlocking Africa's renewable energy potential.

4.3 Technology transfer and job creation

Beyond carbon revenues, Article 6.2 cooperation can accelerate technology transfer and job creation in SSA. Energy transitions not only reduce emissions but also reshape economic structures and labour markets. Investments in solar, wind, and geothermal energy can stimulate domestic manufacturing and strengthen local supply chains for installation, operation, and maintenance.⁹¹

Improved access to modern energy produces multiplier effects across the economy, enhancing agricultural productivity, enabling digital connectivity, and expanding access to healthcare and education. Article 6.2 initiatives that integrate climate finance with development co-benefits therefore have the potential to lift millions out of poverty.⁹²

The African Development Bank's Desert to Power Initiative illustrates this dynamic. The programme aims to deploy 10 GW of solar power capacity across 11 Sahelian countries, supplying electricity to up to 250 million people.⁹³ If aligned with Article 6.2 accounting, the initiative could monetize emissions reductions from displaced fossil-fuel generation, thereby attracting additional investment. Crucially, such programmes generate local employment, strengthen regional grids, and reduce dependence on imported fuels. Article 6.2 thus functions as both a climate mitigation and development instrument.

⁹¹ International Labour Organization, *World Employment and Social Outlook 2023: Greening with Jobs* (ILO 2023) 42–45.

⁹² UNDP, *Annual Report 2022* (UNDP 2022) 14–17 <<https://annualreport.undp.org/2022/>> accessed 5 March 2026.

⁹³ African Development Bank, *Desert to Power: Scaling Solar in the Sahel* (AfDB 2021) <<https://www.afdb.org/en/news-and-events/desert-to-power-initiative-for-africa-18887>> accessed 30 August 2025.

4.4 Revenue potential estimates

The revenue potential of Article 6.2 for SSA is considerable. ITMO transactions provide indicative price signals. Switzerland's KliK Foundation has committed to acquiring ITMOs from twelve countries between 2025 and 2030 at an average price of CHF 20.25 (approximately USD 22.79) per tonne of CO₂.⁹⁴ By comparison, voluntary carbon market prices averaged around USD 8.80 per tonne in 2022.⁹⁵

Forward projections suggest that ITMO prices could rise to USD 80–90 per tonne by 2030 and USD 420–620 by 2050 as mitigation demand increases.⁹⁶ Africa's carbon markets could reduce emissions by up to 1.2 billion tonnes annually through natural capital-based activities alone.⁹⁷ Monetizing just 10 per cent of Africa's deforestation emissions at USD 20 per tonne would yield approximately USD 1.5 billion per year, while high-ambition scenarios could generate revenues approaching USD 50 billion annually by 2030.⁹⁸ These estimates underscore the scale of opportunity. If effectively harnessed, ITMO revenues could rival traditional development assistance and foreign direct investment as a source of external finance.⁹⁹ Unlike aid, however, ITMO revenues are performance-based, directly rewarding verified climate outcomes.

⁹⁴ KliK Foundation, *ITMO Procurement Programme 2025–2030* (KliK 2025) 6–8; Roy Manuell, 'Swiss entity estimates 20 mln ITMOs from current Article 6 carbon pipeline, paying nearly \$40/t' (*Carbon Pulse*, 23 June 2025) <<https://carbon-pulse.com/410505/>> accessed 30 August 2025.

⁹⁵ Ecosystem Marketplace, *State of the Voluntary Carbon Market 2023* (EM 2023) 19–21.

⁹⁶ World Bank (n 77) 67–69; S Saptakee, 'Carbon Credits Supply to Skyrocket 35x by 2050 – But at What Price?' (*CarbonCredits.com*, 27 August 2025) <<https://carboncredits.com/carbon-credits-supply-to-skyrocket-35x-by-2050-but-at-what-price/>> accessed 30 August 2025.

⁹⁷ Global Energy Alliance for People and Planet, Africa Carbon Markets Initiative (ACMI), *Roadmap* (ACMI 2023) 12–14.

⁹⁸ *Ibid.*

⁹⁹ OECD, *Africa Capital Markets Report 2025* (OECD 2025) 89–107 <https://www.oecd.org/en/publications/2025/11/africa-capital-markets-report-2025_a973e07d.html> accessed 5 March 2026.

4.5 Challenges

Despite these opportunities, SSA's participation under Article 6.2 entails significant risks. Dependence on external carbon markets exposes countries to price volatility and shifts in buyer demand, potentially undermining fiscal stability and long-term planning.¹⁰⁰

Monitoring, reporting, and verification (MRV) capacity constitutes a further constraint. Credible ITMOs require robust MRV systems, yet many SSA countries lack the technical and institutional capacity to implement them effectively.¹⁰¹ Weak governance and corruption risks also raise concerns about inequitable benefit distribution and elite capture. These dynamics contribute to fears of “carbon colonialism,” whereby global buyers capture disproportionate value while host countries receive limited returns.¹⁰² Safeguards such as clear ITMO ownership rules, transparent contracts, and mechanisms for directing revenues to local communities are therefore essential.¹⁰³ Mozambique's REDD+ benefit-

¹⁰⁰ Michael Mehling, Gilbert Metcalf and Robert Stavins (n 51) 650-652; Pierpaolo Grippa, Jochen Schmittmann, and Felix Suntheim, ‘Climate Change and Financial Risks’ (*Finance & Development Magazine*, December 2019) 26-29 <<http://getab.li/38453>> accessed 5 March 2026.

¹⁰¹ UNFCCC, *Article 6 Rulebook* (Decision 2/CMA.3, Glasgow Climate Pact 2021) paras 18–25; World Bank, ‘What You Need to Know About the Measurement, Reporting, and Verification (MRV) of Carbon Credits’ (World Bank 27 July 2022) <<https://www.worldbank.org/en/news/feature/2022/07/27/what-you-need-to-know-about-the-measurement-reporting-and-verification-mrv-of-carbon-credits>> accessed 5 March 2026; Maria Luhtaniemi, ‘Successes and challenges when using MRV’ (*ICOS*, 2024) <<https://www.icos-cp.eu/fluxes/3/successes-and-challenges-when-using-mrv>> accessed 30 August 2025

¹⁰² Julia Dehm, ‘Climate Colonialism or Climate Justice? Interrogating the International Climate Regime from a TWAIL Perspective’ (2016) 33 Windsor Y B Access Just 129, 134-137.

¹⁰³ Inger Andersen, ‘High-integrity carbon markets as a lever for climate action’ (Speech delivered at High-Integrity Carbon Markets: Impact to Date and the Path to Accelerated Climate Action at UNEP 9 December 2025) <<https://www.unep.org/news-and-stories/speech/high-integrity-carbon-markets-lever-climate-action>> accessed 5 March 2025.

sharing framework, which mandates payments to local communities, offers a relevant model.¹⁰⁴

The overarching challenge for SSA is to ensure that Article 6.2 advances national priorities rather than external interests. With strong governance, capacity building, and regional collaboration, Article 6.2 has the potential to promote a just energy transition; without them, it risks reinforcing dependency and inequality. Article 6.2 thus provides SSA with an unprecedented opportunity to monetize its natural capital and renewable energy resources while advancing development objectives. Forest protection, landscape restoration, renewable energy deployment, and sustainable agriculture could collectively generate billions of dollars annually, create employment, and reduce poverty. Realizing this promise, however, depends on strengthening institutions, ensuring transparency, and safeguarding sovereignty and equality. If these conditions are met, Article 6.2 could enable SSA to move from a marginal emitter to a central actor in global climate governance.

5. AfCFTA AND CLIMATE-CONSCIOUS INDUSTRIALIZATION

The African Continental Free Trade Area (AfCFTA) represents one of the most ambitious economic integration projects in the developing world. By creating a single market for goods and services across 54 African countries, AfCFTA aims to promote industrialization, intra-African trade, and economic diversification.¹⁰⁵ While AfCFTA was not explicitly designed as a climate instrument, its regulatory and institutional architecture presents important opportunities to integrate climate considerations into Africa's industrial transformation. When aligned with international climate mechanisms such as Article 6.2 of the Paris Agreement, AfCFTA can support a model of climate-conscious industrialization that advances

¹⁰⁴ Government of Mozambique, *National REDD+ Benefit-Sharing Plan* (Ministry of Land and Environment 2018) 9–12.

¹⁰⁵ Agreement Establishing the African Continental Free Trade Area (adopted 21 March 2018, entered into force 30 May 2019) <<https://au.int/en/treaties/agreement-establishing-african-continental-free-trade-area>> accessed 5 March 2026; UN Economic Commission for Africa, *Assessing Regional Integration in Africa IX* (UNECA 2019) 12–15.

mitigation objectives while strengthening economic sovereignty and regional resilience.

5.1 AfCFTA as a Platform for Green Industrial Policy

AfCFTA provides a framework through which African states can coordinate industrial policies and reduce barriers to intra-African trade. Historically, Africa's trade patterns have been characterized by the export of raw materials and the import of manufactured goods, reinforcing dependence on external markets and carbon-intensive supply chains.¹⁰⁶ By encouraging regional value addition and industrial clustering, AfCFTA creates opportunities to embed low-carbon technologies and sustainability standards within emerging industries.

Green industrial policy under AfCFTA could prioritize sectors such as renewable energy manufacturing, electric mobility, sustainable construction materials, and green hydrogen. Coordinated tariff liberalization and rules of origin can support the development of regional supply chains for solar panels, batteries, and wind components, reducing costs and increasing deployment.¹⁰⁷ In this sense, AfCFTA can function as an enabling platform for scaling climate-aligned industries across the continent.

5.2 Harmonizing Carbon Standards and Regulatory Frameworks

A central challenge for African participation in global carbon markets is regulatory fragmentation. Differing national standards for carbon accounting, certification, and environmental safeguards increase transaction costs and weaken bargaining power.¹⁰⁸ AfCFTA offers a

¹⁰⁶ UNCTAD, *Economic Development in Africa Report 2019* (UNCTAD 2019) 7–15 <<https://unctad.org/publication/economic-development-africa-report-2019>> accessed 5 March 2026.

¹⁰⁷ IRENA and AfDB (n 30) 60–66.

¹⁰⁸ World Bank, *State and Trends of Carbon Pricing 2023* (World Bank 2023) 64–66. See also, Vera Songwe, 'The fragmentation of carbon markets must be fixed' (Financial Times, 11 September 2024) <<https://www.ft.com/content/70cc3e67-30c8-42b1-8012-51b496816e63>> accessed 5 March 2026.

mechanism for regulatory harmonization, including the development of common carbon standards and sustainability criteria.¹⁰⁹

Harmonized standards could facilitate cross-border carbon projects and support the emergence of regional carbon markets compatible with Article 6.2 accounting requirements. Alignment between AfCFTA trade rules and climate standards would strengthen the integrity of African ITMOs while reducing transaction costs and increasing international demand.¹¹⁰ This would also reduce the risk of trade disputes and carbon leakage, particularly as developed economies introduce carbon border adjustment mechanisms.¹¹¹ By coordinating approaches to carbon pricing and certification, African states can strengthen their collective position in international negotiations. Harmonization would also allow African states to shape standards that reflect regional conditions, rather than relying on frameworks developed primarily in the Global North.

5.3 Supporting Regional Energy Integration

Energy integration is a core pillar of AfCFTA's long-term economic vision. AfCFTA also has the potential to facilitate regional energy markets and grid connectivity, which are essential for scaling renewable energy deployment across the continent. Many African countries lack sufficient domestic generation capacity, while fragmented infrastructure constrains the development of large-scale renewable projects.¹¹² The Sahel, for example, possesses vast solar potential, yet individual states often lack the scale to implement utility-level projects independently.

AfCFTA can support transboundary energy markets by encouraging investment in cross-border transmission infrastructure, aligning regulatory regimes, and reducing barriers to electricity trade. Existing regional initiatives such as the Southern Africa Power Pool and the West African Power Pool demonstrate the benefits of integration, but AfCFTA

¹⁰⁹ African Carbon Markets Initiative (ACMI), *Roadmap Report* (ACMI 2022) 24–28.

¹¹⁰ Michael Mehling, Gilbert Metcalf and Robert Stavins (n 51) 650–652.

¹¹¹ European Commission, *Carbon Border Adjustment Mechanism Regulation* (EC 2023) <https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en> accessed 5 March 2026.

¹¹² International Energy Agency, *Africa Energy Outlook 2022* (IEA 2022) 39–46 <<https://www.iea.org/reports/africa-energy-outlook-2022>> accessed 5 March 2026.

provides a continental framework capable of scaling these efforts by reducing regulatory barriers and facilitating investment in regional energy infrastructure.¹¹³ By pooling demand and diversifying supply, integrated energy markets can lower prices, enhance reliability, and accelerate renewable deployment.

Renewable energy projects often exceed the scale of national markets, particularly in smaller economies. Cross-border transmission infrastructure enables countries to exploit comparative advantages in renewable resources while improving grid stability and energy security. When combined with Article 6.2 mechanisms, regional energy projects could generate ITMOs at scale, distributing benefits across participating states.¹¹⁴

5.4 AfCFTA, Article 6.2, and Carbon Market Integration

AfCFTA-driven industrialization also creates opportunities to develop green value chains in industries such as cement, steel, fertilizers, and electric mobility. These industries are both development-critical and highly carbon-intensive. Cement production, for instance, is a major source of emissions, though innovations such as blended cements and carbon capture technologies can substantially reduce its footprint.¹¹⁵ Similarly, steel and fertilizer production can transition to low-carbon processes where investment and technology transfer are coordinated with trade policy. AfCFTA can facilitate this shift by establishing standards for low-carbon commodities, incentivizing regional supply chains, and promoting intra-African trade in sustainable products. Electric mobility represents another significant opportunity. By harmonizing regulations for electric vehicle imports, charging infrastructure, and battery recycling,

¹¹³ Southern African Power Pool, *Annual Report 2021* (SADC 2021) 10–13 <<https://www.sapp.co.zw/annual-reports>> accessed 5 March 2026; West African Power Pool (2026) <<https://www.ecowapp.org/>> accessed 5 March 2026.

¹¹⁴ IRENA and AfDB (n 30) 84–88.

¹¹⁵ International Energy Agency, *Net Zero by 2050: Industry Sector* (IEA 2021) 95–99 <<https://www.iea.org/reports/net-zero-by-2050>> accessed 5 March 2026.

AfCFTA could accelerate the transition to cleaner transport systems while fostering new industrial sectors.¹¹⁶

The interaction between AfCFTA and Article 6.2 creates opportunities for a uniquely African approach to carbon markets. While Article 6.2 operates primarily through bilateral cooperation, AfCFTA can provide a regional governance layer that supports coordination, transparency, and capacity-building.¹¹⁷ AfCFTA could play a particularly transformative role by hosting a Pan-African Carbon Market Framework. Such a framework could establish a continental carbon registry, coordinate regional MRV systems, and develop common trading rules.

At present, African participation in global carbon markets remains fragmented, with countries negotiating bilateral agreements individually and often from weak bargaining positions. A continental framework under AfCFTA could aggregate demand and supply, enhance credibility through standardized oversight, reduce transaction costs, mitigate risks associated with unequal bargaining power, and ensure that African priorities shape market participation.¹¹⁸ This approach could help avoid risks of “carbon colonialism,” whereby external buyers capture disproportionate value, and ensure that ITMO revenues support broader regional development goals rather than isolated projects.¹¹⁹

Regional institutions would be central to operationalizing this vision. The African Development Bank (AfDB) has already emerged as a key financier of renewable energy through initiatives such as Desert to Power, while the African Union Development Agency (AUDA-NEPAD) provides technical and policy coordination support.¹²⁰ Leveraging these

¹¹⁶ International Energy Agency, *Global EV Outlook 2023* (IEA 2023) 132–135 <<https://www.iea.org/reports/global-ev-outlook-2023>> accessed 5 March 2026.

¹¹⁷ UNFCCC, *Article 6 Rulebook (Glasgow Climate Pact)* (2021) <<https://unfccc.int/documents/310475>>; Andrei Marcu, *Article 6 rule book – A post COP26 Assessment* (Roundtable on Climate Change and Sustainable Transition (ERCST) 2021)

¹¹⁸ Africa Carbon Markets Initiative, *Roadmap* (ACMI 2022) 13–15.

¹¹⁹ Julia Dehm (n 102) 134–137.

¹²⁰ African Development Bank, *Desert to Power: Scaling Solar in the Sahel* (AfDB 2021) <<https://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/desert-power-initiative>> accessed 5 March 2026; AUDA-NEPAD, *AUDA-NEPAD Annual Report 2025*

institutions, AfCFTA could strengthen capacity for carbon accounting, regulatory compliance, and market development. A Pan-African registry administered under AfCFTA, with technical backing from AfDB and AUDA-NEPAD, would integrate trade facilitation with climate governance and advance a distinctly African carbon market model.

Several case studies illustrate AfCFTA's potential to advance climate-conscious industrialization. AfDB's Desert to Power Initiative aims to deploy 10 GW of solar capacity across eleven Sahelian countries, supplying electricity to up to 250 million people.¹²¹ Its success depends not only on finance mobilization but also on grid interconnection and harmonized energy trade rules – precisely the facilitative role AfCFTA can play. Similarly, proposals for Pan-African solar corridors seek to link high-potential generation zones with demand centers across borders.¹²² Through coordinated investment in transmission infrastructure and standardized power-trading rules, AfCFTA could transform Africa's solar resources into a continental public good.

Nonetheless, significant challenges remain. The political economy of harmonization poses a major obstacle, as states may resist ceding authority over carbon standards or energy policy. Divergent development trajectories, institutional asymmetries, and historical tensions further complicate consensus-building. Financing is another critical constraint. While AfCFTA provides an institutional framework, large-scale investments in transmission, renewable infrastructure, and industrial upgrading require substantial capital.¹²³ Without innovative financing mechanisms – such as blended finance, carbon-backed bonds, or diaspora investment – AfCFTA's ambitions may be difficult to realize.¹²⁴

(AUDA-NEPAD 2025) 18 <<https://www.nepad.org/publication/auda-nepad-2025-annual-report>> accessed 5 March 2026.

¹²¹ African Development Bank, *Desert to Power* (n 120).

¹²² IRENA, *Africa Clean Energy Corridor* (IRENA 2026) <<https://www.irena.org/Energy-Transition/Country-engagement/Regional-Initiatives/Africa-Clean-Energy-Corridor>> accessed 5 March 2026.

¹²³ OECD, *Africa Capital Markets Report 2025* (OECD Capital Market Series, OECD 2025) ch.4 <<https://doi.org/10.1787/7d26e1d3-en>> accessed 5 March 2026.

¹²⁴ African Development Bank, *African Economic Outlook 2023* (AfDB 2023) 91 <<https://www.afdb.org/en/documents/african-economic-outlook-2023>> accessed 5 March 2026.

Enforcement also presents a persistent challenge, as weak compliance mechanisms could undermine implementation and exacerbate uneven development.

Despite these constraints, AfCFTA's potential to advance climate-conscious industrialization is substantial. By harmonizing standards, enabling energy integration, developing green value chains, and supporting a Pan-African carbon market, AfCFTA could reshape Africa's development trajectory. The alternative – fragmented markets, inconsistent standards, and fossil-fuel-dependent growth – would squander Africa's opportunity to lead a more sustainable global transition. AfCFTA is therefore not merely a trade agreement, but a platform for aligning economic integration with climate justice, resilience, and sovereignty.

6. GOVERNANCE, EQUITY, AND THE FUTURE OF CLIMATE-CONSCIOUS INTEGRATION

While Article 6.2 of the Paris Agreement and the African Continental Free Trade Area (AfCFTA) offer promising financing mechanisms for Africa's low-carbon transition, their developmental impact depends fundamentally on how they are governed and implemented. Governance, equality, and justice are therefore central to assessing whether these instruments promote inclusive development or entrench existing inequalities. Poorly designed carbon markets risk reproducing extractive dynamics in which wealthier states and companies capture disproportionate benefits at the expense of African sovereignty and local communities. Conversely, Article 6.2 and AfCFTA can support a just energy transition if underpinned by robust safeguards, transparent institutions, and community-oriented governance.

6.1 Risks of carbon colonialism — who benefits?

The concept of “carbon colonialism” reflects concerns that African countries may become low-cost suppliers of emissions reductions to wealthier states without securing commensurate developmental gains. Under such scenarios, African states could transfer large volumes of ITMOs at relatively low prices, enabling richer countries to meet their

NDCs while constraining Africa's future mitigation and development options. These risks are amplified by structural asymmetries in bargaining power, as wealthier governments and multinational firms typically possess superior financial leverage, legal expertise, and technical capacity.¹²⁵

There is also concern that ITMO revenues may accrue primarily to intermediaries such as international project developers and consultants rather than host governments or affected communities. Experience under the Kyoto Protocol's Clean Development Mechanism (CDM) is instructive: despite Africa's mitigation potential, the continent accounted for fewer than two per cent of registered CDM projects, and local co-benefits were often limited.¹²⁶ Replicating such patterns under Article 6.2 would undermine the normative foundations of a just transition and deepen dependency on external actors.

6.2 Sovereignty and national ownership of ITMOs

Ensuring national sovereignty over carbon assets is a core governance challenge. Because ITMOs are authorized emissions reductions transferred between states, they raise fundamental questions regarding ownership, authorization, and revenue allocation. Absent clear domestic legal frameworks, ITMO transactions risk opacity, elite capture, or exploitation by external purchasers.

National legislation governing ITMO authorization and transfers is therefore essential. Such frameworks must balance short-term revenue generation against long-term mitigation and development objectives, including preserving sufficient emissions space to meet future NDC commitments. Sovereignty in this context requires not only legal ownership but also the capacity to define the terms of engagement. Rather than adopting buyer-driven standards, SSA countries should assert African-defined safeguards, MRV frameworks, and pricing approaches that reflect their mitigation value. AfCFTA can play a coordinating role

¹²⁵ Julia Dehm (n 102) 134-137.

¹²⁶ UNFCCC, *Benefits of the Clean Development Mechanism 2012* (UNFCCC 2012) 61-63. <https://cdm.unfccc.int/about/dev_ben/index.html> accessed 5 March 2026.

by enabling collective negotiation and reducing vulnerabilities associated with fragmented bilateral arrangements.

6.3 Ensuring community-level benefit-sharing

Equity in carbon markets ultimately depends on whether local communities – who steward much of Africa’s natural capital – receive tangible and fair benefits. Mitigation activities such as avoided deforestation, afforestation, and agroforestry directly affect forest-dependent households, smallholder farmers, and rural communities. Where benefits are poorly distributed, projects risk social resistance, loss of legitimacy, and adverse livelihood impacts.¹²⁷

African experience highlights both risks and promising practices. Mozambique’s REDD+ benefit-sharing framework, which directs a share of carbon revenues to local communities, demonstrates how conservation incentives can be aligned with local development priorities.¹²⁸ Similarly, Kenya’s International Small Group and Tree Planting Programme (TIST) enables smallholder farmers to participate directly in carbon markets through agroforestry and soil-carbon initiatives. By combining training, monitoring, and direct payments, such models illustrate how carbon finance can be embedded within local livelihoods rather than imposed through top-down mechanisms.¹²⁹

6.4 Gender, youth, and marginalized communities in climate projects

Justice-oriented climate governance also requires deliberate inclusion of groups that are routinely marginalized in decision-making. Climate impacts in Sub-Saharan Africa disproportionately affect women, youth,

¹²⁷ FAO, *Governing Tenure Rights to Commons* (FAO 2016) 41–44 <<https://openknowledge.fao.org/handle/20.500.14283/i6381en>> accessed 3 March 2026.

¹²⁸ Government of Mozambique, *National REDD+ Benefit-Sharing Plan* (Ministry of Land and Environment 2021) 9–12 <https://redd.unfccc.int/submissions/by-country/country_detail/moz.html> accessed 3 March 2026.

¹²⁹ International Small Group and Tree Planting Program (TIST), *Programme Overview* (2022) <<https://program.tist.org/>> accessed 3 March 2026.

and vulnerable populations, yet these groups often face barriers related to land tenure, finance, and participation.¹³⁰

Women, for example, bear disproportionate burdens associated with traditional energy use, including exposure to indoor air pollution and time poverty from fuel collection. Clean cooking and renewable energy projects can deliver both mitigation and gender-equity benefits, but only if women are meaningfully involved in project design and benefit-sharing. Youth – who comprise over 60 per cent of Africa’s population – face persistent unemployment but stand to benefit significantly from green sectors such as renewable energy and sustainable agriculture. Realizing this potential requires targeted skills development and institutional support. Inclusion must also extend to pastoralists, indigenous peoples, and residents of informal settlements, without which carbon markets risk reinforcing existing inequalities.¹³¹

6.5 Aligning Article 6.2 and AfCFTA with SDGs and AU’s Agenda 2063

Finally, the governance of Article 6.2 and AfCFTA must be embedded within broader sustainable development frameworks. The UN Sustainable Development Goals (SDGs) and the African Union’s Agenda 2063 articulate shared priorities around poverty reduction, gender equality, food security, industrialization, and environmental sustainability. Carbon markets and regional trade integration should therefore function as instruments for advancing these objectives rather than as ends in themselves.¹³²

ITMO revenues can be channeled into education, healthcare, climate adaptation, and infrastructure, directly supporting SDG implementation. Likewise, AfCFTA’s role in harmonizing carbon standards and enabling regional energy integration aligns with African Union’s Agenda 2063’s

¹³⁰ UN Women, *Gender, Climate and Security: Sustaining inclusive peace on the frontlines of climate change* (UN Women 2020) <<https://www.unwomen.org/en/digital-library/publications/2020/06/gender-climate-and-security>> accessed 3 March 2026.

¹³¹ ILO, *World Employment and Social Outlook: Greening with Jobs* (ILO 2018) 42–45 <https://www.ilo.org/global/publications/books/WCMS_628654/lang--en/index.htm> accessed 3 March 2026.

¹³² United Nations, *Transforming our World: The 2030 Agenda for Sustainable Development* (UN 2015) paras 7–18 <<https://sdgs.un.org/2030agenda>> accessed 3 March 2026.

vision of a prosperous, integrated, and sustainable Africa. Achieving this alignment requires deliberate policy design, including embedding Article 6.2 activities within national development strategies and establishing mechanisms to track SDG contributions. Regional institutions such as the African Development Bank and AUDA-NEPAD can provide technical oversight to ensure coherence between climate governance and Africa's long-term development goals.¹³³

Ultimately, the interaction between Article 6.2 and AfCFTA presents Africa not merely with an opportunity to participate in global carbon markets, but to shape them. The question is not whether SSA can generate mitigation outcomes, but whether it can institutionalize governance structures that retain value, safeguard equity, and align climate finance with continental development priorities. If properly governed, cooperative carbon mechanisms and regional integration can move Africa from a peripheral supplier of offsets to a central architect of climate-conscious development.

Realizing these opportunities requires coordinated sequencing: embedding Article 6.2 within NDC planning frameworks, clarifying ITMO ownership and transfer rules in domestic law, strengthening monitoring, reporting, and verification (MRV) systems to ensure environmental integrity and avoid double counting,¹³⁴ and leveraging AfCFTA as a platform for regulatory harmonization and collective bargaining. Innovative financing mechanisms – including blended finance structures and carbon-backed instruments – can further mobilize capital while reducing investment risk.¹³⁵ The strategic challenge for SSA is

¹³³ African Union, *Agenda 2063: The Africa We Want* (AU 2015) 12–17 <https://au.int/Agenda2063/popular_version> accessed 3 March 2026.

¹³⁴ World Bank, *Digital Monitoring, Reporting, and Verification Systems and Their Application in Future Carbon Markets* (World Bank 2022) 17–20 <<https://doi.org/10.1596/37622>> accessed 3 March 2026.

¹³⁵ OECD, *Blended Finance in the Least Developed Countries 2020: Supporting a Resilient COVID-19 Recovery* (OECD 2020), 15–18 <https://www.oecd.org/en/publications/blended-finance-in-the-least-developed-countries_57620d04-en.html> accessed 3 March 2026; World Bank, *Innovative Tools for Climate Action* (World Bank 2021) <<https://www.worldbank.org/en/news/feature/2021/11/03/innovative-tools-for-climate-action>> accessed 3 March 2026.

therefore not conceptual but institutional: constructing integrated governance frameworks capable of retaining value, safeguarding equity, and aligning climate finance with continental development priorities.

7. CONCLUSION

Sub-Saharan Africa (SSA) embodies one of the defining contradictions of contemporary climate governance. Although responsible for less than four per cent of cumulative global emissions,¹³⁶ the region remains disproportionately vulnerable to climate-induced droughts, floods, food insecurity, and economic instability.¹³⁷ At the same time, it possesses some of the world's most significant untapped mitigation potential in its forests, agricultural landscapes, and renewable energy resources.¹³⁸ This combination of limited responsibility, acute vulnerability, and vast potential positions SSA not merely as a recipient of climate policy, but as a potential architect of its future direction.

Article 6.2 of the Paris Agreement provides a finance-ready mechanism through which this potential can be translated into structured climate cooperation. By enabling the generation and transfer of internationally transferred mitigation outcomes (ITMOs), Article 6.2 creates opportunities to mobilize capital for renewable energy, clean cooking, agroforestry, and land restoration. However, its transformative capacity depends on governance. Without robust monitoring systems, legal clarity over ITMO ownership, and equitable benefit-sharing, cooperative carbon markets risk reproducing extractive dynamics rather than advancing a just transition.¹³⁹ With appropriate safeguards, by contrast, Article 6.2 can

¹³⁶ P Friedlingstein and others, 'Global Carbon Budget 2023' (2023) 15 *Earth Syst. Sci. Data* 5301, 5318–5322.

¹³⁷ IPCC, *AR6 Synthesis Report* (IPCC 2023) 44–48 <<https://www.ipcc.ch/report/ar6/syr/>> accessed 3 March 2026.

¹³⁸ Bronson W. Griscom and others, 'Natural Climate Solutions' (2017) 114 *PNAS* 11645–11650; IRENA and AfDB, *Renewable Energy Market Analysis: Africa and Its Regions – A Summary for Policy Makers* (IRENA 2025) 9–18 <<https://www.irena.org/publications/2022/Jan/Renewable-Energy-Market-Analysis-Africa>> accessed 3 March 2026.

¹³⁹ Julia Dehm (n 102) 134–137; Transparency International (n 66).

support technology transfer, rural livelihoods, gender inclusion, and resilience-building while preserving national climate commitments.

AfCFTA provides a complementary institutional foundation. Beyond trade liberalization, AfCFTA offers a platform for harmonizing standards, supporting regional energy integration, and fostering green value chains in sectors central to Africa's industrial future. When aligned with Article 6.2, AfCFTA enables mitigation efforts to scale beyond isolated national projects into a coordinated continental strategy. In this integrated framework, carbon finance is not an end in itself, but a lever for structural transformation – supporting infrastructure, industrial upgrading, and shared prosperity.¹⁴⁰

The convergence of Article 6.2 and AfCFTA thus permits a distinctly African model of climate-conscious development – one that rejects extractive offset paradigms that treat Africa primarily as a source of low-cost offsets and instead it advances a framework in which carbon assets and renewable resources strengthen sovereignty, equity, and resilience consistent with Agenda 2063 and the Sustainable Development Goals. Sovereignty requires that African states define the conditions of engagement in carbon markets and retain long-term mitigation space. Equity demands that communities, particularly women, youth, and marginalized groups, receive tangible benefits from climate cooperation. Resilience calls for reinvesting climate revenues into adaptation, public goods, and institutional capacity.

The central argument advanced in this article is that Africa's paradox of low emissions and high vulnerability need not translate into structural disadvantage. If embedded within coherent governance frameworks and regional coordination, cooperative carbon mechanisms and trade integration can reposition SSA from a peripheral supplier of mitigation outcomes to a rule-shaper in global climate governance. The challenge ahead is institutional rather than conceptual: building the legal, financial, and regional architectures capable of retaining value while advancing justice. If achieved, SSA may demonstrate that mitigation, adaptation, and

¹⁴⁰ UNIDO, *Industrial Development Report 2022* (UNIDO 2022) 58–61 <<https://www.unido.org/idr2022>> accessed 3 March 2026.

development can be pursued as mutually reinforcing pillars of an equitable global transition. Whether this promise is realized will depend not only on market participation, but on deliberate governance choices that ensure climate cooperation advances Africa's long-term development priorities rather than external interests.