AFRICAN CLIMATE FOUNDATION

LSE Firoz Lalji Institute for Africa



Trade and Climate Sustainability 2026 Series

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Acronyms and abbreviations

AAM	Active anode material
ACF	African Climate Foundation
AEL	Africa Express Line
AfCFTA	African Continental Free Trade Area
AFRAA	African Airlines Association
AFS	Agreement on Fisheries Subsidies
AGII	Africa Green Industrialisation Initiative
AGMS	Africa's Green Minerals Strategy
APRI	Africa Policy Research Institute
AtJ	Alcohol to jet
AU	African Union
CBAM	Carbon Border Adjustment Mechanism
CBDR-RC	Common but Differentiated Responsibilities and Respective Capabilities
CEMZA	Combined Exclusive Maritime Zone of Africa
CEO	Chief executive officer
CIA	Comprehensive Impact Assessment
CIMC	China International Marine Containers
CO_2	Carbon dioxide
COP30	2025 UN Climate Change Conference
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
CTIP	Clean Trade and Investment Partnership
DPP	Dialogue on Plastics Pollution and Environmentally Sustainable Plastics Trade
DRC	Democratic Republic of the Congo
DRI	Direct reduced iron
EEA	European Economic Area
EGS	Environmental Goods and Services
ETS	Emissions Trading System
EU	European Union

EUA	European Union Allowances
EV	Electric vehicle
FFSR	Fossil Fuel Subsidy Reform
FT	Fischer–Tropsch
FTA	Free trade agreement
gCO_2eq/kWh	Grams of carbon dioxide equivalent per kilowatt-hour
GDP	Gross domestic product
GHG	Greenhouse gas
GIADEC	Ghana Integrated Aluminium Development Corporation
GW	Gigawatt
HEFA	Hydroprocessed esters and fatty acids
HS	Harmonized System
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IEA	International Energy Agency
IFCCT	Integrated Forum on Climate Change and Trade
IFD	Investment Facilitation for Development [Agreement]
IISD	International Institute for Sustainable Development
IMO	International Maritime Organization
IRENA	International Renewable Energy Agency
KfW	Kreditanstalt für Wiederaufbau
km	Kilometre
kWh	Kilowatt-hour
$kWh/m^2/year$	Kilowatt-hours per square metre per year
kWh/t	Kilowatt-hours per tonne
LDC	Least-developed country
LEAP	Leading Effective Afrocentric Participation
LFP	Lithium iron phosphate
LLDC	Land-locked developing country
LMFP	Lithium manganese iron phosphate
LNG	Liquified natural gas
LSE	London School of Economics and Political Science
MENA	Middle East and North Africa
MC14	14th Ministerial Conference
MFN	Most favoured nation
MoU	Memorandum of understanding
MRV	Monitoring, reporting and verification
m/s	Metres per second
MSMEs	Micro-, small and medium enterprises
MSW	Municipal solid waste

Mt	Million tonnes
MW	Megawatt
NMC	Nickel, manganese, cobalt
NZF	Net-Zero Framework
OECD	Organisation for Economic Co-operation and Development
OPS	Onshore power supply
PGMs	Platinum group metals
PtL	Power to liquid
PV	Photovoltaic
RTK	Revenue tonne-kilometre
SAATM	Single African Air Transport Market
SAF	Sustainable aviation fuel
SCZONE	Suez Canal Economic Zone
SEZ	Special economic zone
SIDS	Small island developing state
SMF	Sustainable maritime fuel
SPS	Agreement on the Application of Sanitary and Phytosanitary Measures
TBT	Agreement on Technical Barriers to Trade
tCO_2	Tonnes of carbon dioxide
tCO_2e/MWh	Tonnes of carbon dioxide equivalent per megawatt-hour
tCO_2e/t	Tonnes of carbon dioxide equivalent per tonne of product
TDF	Temporary Decarbonisation Fund
TESSD	Trade and Environmental Sustainability Structured Discussions
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
TRL	Technology readiness level
TUM	Technical University of Munich
UCL	University College London
UCO	Used cooking oil
UK	United Kingdom
UN	United Nations
UNCTAD	UN Conference on Trade and Development
UNECA	UN Economic Commission for Africa
US	United States
VALCO	Volta Aluminium Company
WTO	World Trade Organization

Preface

We are living through a period of simultaneous transitions that are reshaping the foundations of the global economy. Geopolitical tensions, technological disruption, climate imperatives and the fragmentation of long-established multilateral arrangements are converging in ways that challenge many of the assumptions that have guided trade and development policy for decades. For Africa, this is not simply a moment of heightened uncertainty, but it is also a moment that demands strategic agency and a clearer understanding of how the continent can position itself in a rapidly changing global order.

What distinguishes the current moment is not only the scale of disruption but also the growing convergence between trade and climate agendas. Measures once considered peripheral to trade policy – from carbon border adjustments to sectoral decarbonisation standards, to green industrial incentives – are increasingly shaping patterns of competitiveness, investment and market access. The boundaries between climate governance and trade governance are becoming less distinct, even as the institutions responsible for each continue to evolve unevenly. Against this backdrop, initiatives such as the Integrated Forum on Climate Change and Trade represent important attempts to foster greater coherence between policy communities that have too often operated in silos. For Africa, this convergence creates both new vulnerabilities and new opportunities, making informed and strategic engagement more important than ever.

That is why the contributions gathered in this volume examine one of the most consequential dimensions of the increasingly complex relationship between trade, climate and industrial development. As countries pursue decarbonisation through a growing array of national, regional and sector-specific measures, the rules governing international commerce are being rewritten in real time. The question is no longer whether climate policy will reshape trade, but how these changes can be harnessed to advance African development priorities.

The purpose of this series is clear: to examine these transformations through an African lens and to identify pathways that advance both climate ambition and economic development. The analysis is informed by the landmark 2025 Africa Climate Summit in Addis Ababa, which marked an important turning point in the continent's climate narrative. Africa asserted itself not as a victim of climate change nor a passive recipient of assistance, but as a provider of solutions and an indispensable actor in the global green transition. This vision aligns closely with the African Climate Foundation's mission to help shape a development trajectory that combines industrialisation, sustainability and economic resilience.

It is important not to equate the erosion of traditional multilateral arrangements with a sole source of risk. It also creates opportunities to rethink rules, institutions and partnerships. For too long, global trade frameworks treated environmental sustainability as peripheral to economic development. Today, the challenge is not simply to correct that imbalance but to demonstrate that climate action and industrial transformation can be mutually reinforcing. Africa has the resources, the demographic dynamism and the renewable energy potential to lead in this new era, provided that it acts with confidence and purpose.

The policy briefs in this volume offer practical and evidence-based contributions to that effort. They examine the risks and opportunities arising from the decarbonisation of maritime transport and aviation, sectors that are critical to Africa's connectivity and competitiveness. The briefs move beyond rhetoric about value addition by exploring the realities of developing supply chains for electric vehicle batteries across the continent. They also assess how large-scale clean energy investments can be harnessed to support domestic industrialisation and regional development rather than simply serving external demand.

In a context where traditional global institutions are struggling to provide direction, these papers explore alternative avenues for African agency. They assess how countries can navigate the consequences of the 14th Ministerial Conference, respond to increasingly complex decarbonisation negotiations and leverage continental initiatives such as the Africa Green Industrialisation Initiative, Africa's Green Minerals Strategy, and the African Continental Free Trade Area. The challenge is not merely to adapt to a changing global system but also to help shape it. Africa must move from being a rule-taker to becoming an active architect of the frameworks that will define the future of trade and climate governance.

I am confident that the insights contained in this volume will be valuable to policy-makers, negotiators, researchers and advocates across the continent and beyond. At a time when fragmentation is reshaping the global economy, Africa must resist the temptation to retreat into defensiveness. Instead, it must seize the opportunity to advance a positive and ambitious agenda – one that places climate action at the centre of economic transformation, and positions the continent as a decisive force in shaping a more sustainable and equitable global future.

Prof. Carlos Lopes
Chairperson, African Climate Foundation

Introduction

Welcome to the second edition of the *Trade and Climate Sustainability Briefs 2026*. The fundamental objective of the collection is to offer timely analysis of key issues at the intersection of trade and climate policy, written by leading experts in the field. This annual series of ACF-LSE Briefs is inspired by the need not only to contribute to the alignment of trade and climate objectives from an African perspective, but to do so in ways that offer insights for delivering equitable and broad-based economic and social gains while accelerating progress towards carbon neutrality and climate resilience.

Trade and climate policy are no longer parallel conversations. They now shape one another directly and decisively. International trade influences investment flows, production patterns, industrial competitiveness, and the pace of technology development and transfer. It is central to achieving the goals of the Paris Agreement. At the same time, climate action is reshaping the trade policy landscape as economies transition, creating new opportunities for sustainable transformation while also generating new risks and distributional pressures.

Recognition of these deep interdependencies helped drive the launch of the Integrated Forum on Climate Change and Trade (IFCCT) at COP30 in 2025 under the Brazilian Presidency. Brazil and Australia have since co-led a consultative phase on the Forum's modalities and thematic focus in partnership with Türkiye as host of the 2026 COP31, with a view to launching a work programme at that COP. The IFCCT has the potential to become an important platform for more practical, inclusive, and forward-looking cooperation on trade-related climate challenges. By the time COP 32 meets in Africa, hosted by Ethiopia, robust engagement on its work programme is expected to be well underway

To some extent, the establishment of the IFCCT reflects the lack of momentum in in the World Trade Organization (WTO) on trade-related climate issues. The multilateral trading system has struggled to respond to the scale and complexity of the current moment. As noted by the African Union Maputo Ministerial Declaration on the Fourteenth WTO Ministerial Conference '[T]he multilateral trading system, and the WTO in particular, is facing a profound systemic crisis, reflected in persistent negotiating paralysis, unresolved development issues, weakened enforcement mechanisms, growing unilateralism, protectionism, fragmentation, the marginalisation of developing-country priorities, and the erosion of trust among Members.'

This crisis stems in large part from the elevation of national economic security over multilateral rules, as geoeconomic rivalry and geopolitical fragmentation intensified during the first quarter of the century. The paralysis of the WTO dispute settlement system was an early warning sign. Since then, the strain has deepened. Leading members are now increasingly willing to sidestep core disciplines, including the Most-

Favoured-Nation (MFN) principle, long regarded as a cornerstone of non-discrimination in the multilateral trading system. As Mark Carney observed at the 2026 World Economic Forum, the global economy is facing "a rupture, not a transition".

Against this backdrop of geo-fragmentation, mounting uncertainty and policy volatility, it is essential that emerging trade–climate debates are shaped by an African perspective grounded in the continent's development priorities and aspirations. Africa cannot approach these debates as a passive rule-taker. It has strategic interests to define, policy space to defend, and opportunities to seize. These range from green industrialisation and energy development to transport decarbonisation and carbon markets that are fit for purpose. This moment therefore creates an opening for African countries to sharpen their priorities, clarify their negotiating positions, and engage as a decisive actor in delivering solutions while ensuring that new trade–climate strategies support development rather than constrain it.

This is the context in which this collection of briefs is published. As in the inaugural edition, it brings together six briefs designed to equip negotiators and policy-makers with policy-relevant insights on critical issues at the trade–climate interface. Together, they address four overarching themes: (a) carbon pricing at the border and beyond; (b) decarbonising transport systems on land, sea and air: electric vehicles, maritime shipping and aviation; (c) the role of clean energy in future proofing Africa's industrial development and risks of premature exports; and (c) multilateralism in crisis exemplified by a weakened WTO.

Carbon pricing at the border and beyond

The brief **Beyond the rhetoric: What the EU and UK CBAMs mean for Africa?** examines how border carbon adjustments are reshaping global trade rules and climate action with important implications for Africa. The EU's Carbon Border Adjustment Mechanism (CBAM), fully operational since January 2026, requires importers to purchase certificates covering the embedded emissions of goods in six carbon-intensive sectors. A raft of implementing legislation was announced in December 2025 which extends the scope of the mechanism and clarifies how it will be operationalised with important implications for Africa. Further modifications are expected in the coming years. For example, within the framework of the Paris Agreement Article 6, the EU is reportedly looking to allow up to 10% of international carbon credits and unlimited domestic compliant carbon credits to be used to reduce CBAM levies for companies exporting to Europe. This could potentially lower the overall cost of climate action while generating funds for climate finance.

The UK is set to introduce its own CBAM in January 2027, with immediate financial obligations and no transitional period. Understanding these developments is essential for African countries seeking to manage new trade requirements while advancing industrialisation and sustainable development goals.

Based on country- and sector-specific case studies, the brief shows that CBAM's effects will be uneven across Africa. Outcomes will depend on production methods, energy sources, export structures, decarbonisation options, and the capacity to measure and verify emissions. For some countries, especially those with cleaner energy systems, CBAM may create opportunities to strengthen competitiveness. For others, particularly those reliant on carbon-intensive energy and with limited institutional capacity, it may deepen existing vulnerabilities. The brief further underlines that impacts may vary within the same country by sector and over time, as the mechanism evolves. Its conclusion is clear: African countries need a proactive and coordinated continental response, combining diplomatic engagement, targeted domestic reform, and stronger monitoring, reporting and verification (MRV) capacity.

Decarbonising transport systems: Electric vehicles, maritime shipping and aviation

Transport systems on land, sea and air, on which trade depends, are being rapidly reshaped by decarbonisation. Three of the briefs in the collection examine what these shifts mean for Africa and how the continent can position itself more strategically within emerging low-carbon transport value chains.

The brief **Beyond extraction: Leveraging global critical mineral demand to support African EV battery production**, examines how African countries can use rising demand for critical minerals and shifts in EV battery technology to move beyond extraction and build competitive battery production as part of a broader green industrial strategy. Success will require active industrial policy, stronger research and technology foresight, clear market positioning and smart economic diplomacy that secures partnerships without deepening dependency. It will also require a regional approach, since no single country holds all the minerals needed for battery value chains. Above all, the brief warns against replacing one form of commodity dependence with another. The central objective must be resilient development and economic diversification.

The brief **Taking the wheel: Steering Africa through the risks and opportunities of maritime decarbonisation** looks at global shipping which contributes 3% of global greenhouse gas emissions, and fast-moving action to decarbonise the sector. The International Maritime Organization (IMO) is committed to a Net-Zero Framework (NZF) for the sector, with new proposals being put on the table and an important decision point meeting scheduled for November 2026.

For Africa, the stakes are especially high. Maritime transport carries around 90% of the continent's international trade by volume, yet African countries already face freight costs well above the global average. Decarbonisation initiatives, whether global or unilateral, are therefore likely to add cost and complexity to an already difficult trading environment, with implications for food security and long-term development. At the same time, they may create opportunities linked to the production of green fuels, sustainable port and transport hubs, and wider green industrialisation. The brief argues that these opportunities will not materialise automatically. While the costs are likely to be broad-based, especially for vulnerable net food- and fuel-importing economies, the gains are more likely to be concentrated in countries that can intensify the pace of adaptation and take advantage of emerging opportunities.

The policy message to African governments is the need to move quickly to assess country-level risks and opportunities, including priorities for the use of any decarbonisation-related revenues. They should approach IMO negotiations, and discussions with the EU and other partners pursuing unilateral measures, with a unified position and clearly defined demands. Avoiding duplication between global and unilateral regimes will be critical, as will ensuring that any revenue-distribution mechanism is designed at the right scale, has an equitable governance structure, is mandated to support the economies most affected and to finance adaptation transitions. More broadly, the brief argues that maritime decarbonisation should be treated not only as a compliance challenge, but as a strategic opening to turn transition pressures into a value proposition while simultaneously generating positive environmental and social benefits.

The brief **Turbulence ahead: the risks and opportunities of global aviation decarbonisation for African economic development** examines the far-reaching consequences of sustainable aviation fuel (SAF) mandates, off-set and emission trading schemes alongside the opportunities for African countries.

Aviation is strategically important to Africa's development. It supports high-value and perishable exports, tourism, business connectivity, manufacturing, and a growing range of aviation services. Although African aviation accounts for only a small share of global passenger traffic, it already makes a significant contribution to jobs, GDP, freight, and tourism, and is expected to grow rapidly over the coming decades. Given this broad-based developmental role, African countries are seeking to expand the sector to deepen trade integration and industrialisation. Yet global and unilateral decarbonisation measures are accelerating in ways that could impose disproportionate costs on a sector that remains in an early stage of development and contributes only a small share of global aviation emissions. SAF mandates, offset schemes, and possible extensions of emissions trading systems risk raising operating costs, with knock-on effects for airlines, time-sensitive exports, tourism, and broader economic development, particularly in least-developed countries (LDCs) and small island developing states (SIDS).

The brief argues, however, that decarbonisation is not only a risk. Several African countries have strong potential to develop competitive SAF industries, which could strengthen energy sovereignty, support industrial upgrading, and create high-quality jobs. That potential remains largely untapped. Unlocking it will require stronger continental and national policy frameworks including targeted support for technology and skills transfer and protection against the premature export of critical feedstocks.

The policy message is therefore twofold. African governments need a much more granular assessment of the risks posed by emerging decarbonisation regimes, particularly any extension of the EU ETS, and they should press for unified positions in international forums to avoid double burdens and secure support for countries most affected. As is the case with climate action in other sectors, they should treat SAF not simply as a compliance issue, but as a strategic industrial opportunity requiring active market creation and stronger local value addition.

The role of clean energy in futureproofing Africa's industrial development and risks of premature exports

Africa's industrialisation will unfold under conditions unlike those faced by earlier transformations. It must be cleaner, more resource-efficient and powered increasingly by renewable energy, even as the continent confronts poverty, infrastructure gaps, and difficult trade offs around energy transition. Yet this constraint also creates opportunity: green industrialisation could enable Africa to leapfrog into cleaner technologies, build new value chains around critical minerals and green hydrogen, and better harness its vast renewable energy potential. The central challenge is to pursue the clean energy transition in ways that support both environmental sustainability and just development.

It is against this background that the brief **Clean energy for export in Africa: What is at stake for African policy-makers?** asks a critical question: how can African countries harness rising investment in clean energy exports without diverting resources from domestic development priorities? Across the continent, large-scale projects, from renewable power generation and grid interconnections to green hydrogen and other clean energy-based resources, are increasingly being developed for external markets with European actors playing a leading role in financing and project development. These investments could help unlock Africa's vast renewable potential and support sustainable development, but only if they are aligned with domestic energy access, energy security, sovereignty, and green industrialisation objectives.

The brief's central warning is that without deliberate policy choices, clean energy export projects may reproduce extractive patterns in greener form: external demand could shape the use of African resources in ways that do little to expand domestic energy access or deliver tangible benefits to local communities. Yet the brief also argues that this trajectory is not fixed. Because many projects remain at an early stage, African policy-makers still have a window to shape contractual terms, regulatory frameworks, and governance arrangements so that these investments support jobs, technology transfer, skills development, industrial diversification, local value creation and energy security.

The broader message is clear. The global energy transition is reshaping trade, investment, and geopolitical relations in ways that will define Africa's place in the emerging green economy. The question is not whether African countries will participate, but on what terms. If approached strategically, clean energy exports could strengthen energy sovereignty and contribute to long-term transformation. If not, they risk reinforcing dependence under a new model of extraction.

Multilateralism in crisis: A weakened WTO

Finally, the brief **Sustainability at MC14: Outcomes and impacts for Africa**, examines what the 14th WTO Ministerial Conference in Yaoundé, Cameroon, revealed about the state of multilateralism. Hosting MC14 on African soil carried symbolic weight, but expectations were low from the outset. Against a backdrop of geopolitical instability, growing scepticism towards foundational WTO principles such as MFN and a wider turn away from multilateralism, the conference failed to deliver on its core agenda and closed without an overall ministerial declaration.

Sustainability fared no better in the formal negotiations. The most substantive movement came instead through member-driven plurilateral initiatives, notably the Trade and Environmental Sustainability Structured Discussions (TESSD), the Dialogue on Plastics Pollution and Environmentally Sustainable Plastics Trade (DPP), and the Fossil Fuel Subsidy Reform (FFSR) dialogue. However, their outputs, technical papers, best-practice frameworks, and non-binding commitments rather than binding agreements, reflect an important shift in how the WTO is functioning on sustainability – a distinctive movement towards voluntarism that reflects a weakened WTO. Nonetheless, these initiatives remain important for global benchmarking.

For African countries, the implication is clear. Even as new forums such as the IFCCT begin to play a key role on trade and climate issues, WTO processes will matter for setting voluntary standards. Some aspects of TESSD, DPP and FFSR may well migrate to the IFCCT. That makes it all the more important for African members to define a coherent sustainability-related trade agenda as a basis for stronger collective positioning at the WTO.

The brief's broader message is that, even in the absence of formal MC14 outcomes, African members still have room to act. Existing WTO frameworks and sustainability initiatives can be leveraged to strengthen the link between trade and development priorities, from green industrial policy and environmental goods to plastics regulation, adaptation, and technology transfer. The challenge is to move from reactive engagement to strategic use of WTO-based initiatives as a tool for Africa's sustainable future.

Final observations

Taken together, the six briefs make a single overarching point: trade and climate policy are now inseparable, and the terms on which they are linked will have major consequences for Africa's development. Across carbon border adjustment measures, transport decarbonisation, clean energy exports, and the erosion of multilateral trade governance, the collection shows that the green transition is not only an environmental agenda. It is also an industrial, trade, and geopolitical agenda that is shaping competitiveness, investment, market access, and policy space. For Africa, the briefs illustrate the risks: rising compliance costs, new forms of exclusion, and the danger that external rules or demand patterns entrench dependence in greener form. But the briefs also show that the opportunities are equally real: green industrialisation, new value chains, cleaner transport systems, expanded energy sovereignty, and a stronger role in setting the terms of action at the trade and climate interface through the IFCCT and the WTO.

The policy conclusion is straightforward. African countries cannot afford to approach the trade–climate agenda as passive recipients of rules made elsewhere. They need coordinated positions, leveraging of continental initiatives like the AfCFTA, stronger domestic capacity, sharper industrial strategies, and sustained engagement in the institutions and negotiations that will shape the emerging phase of global economic and sustainability governance. The task is not simply to respond to external change, but to shape it – so that trade, climate action, and industrial transformation reinforce one another in ways that advance Africa's own development priorities.

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1

Clean energy for export in Africa: What is at stake for African policy-makers?

H. Suzy Nikièma

Key messages

- **A new clean energy export dynamic is emerging in Africa.** Across the continent, a growing number of clean energy initiatives – from power generation to grid interconnections to renewable hydrogen projects – are being developed primarily to export energy, or energy-based commodities, to markets outside Africa.
- **European actors dominate project financing and development.** Most clean energy export projects are financed by European public and private institutions, reflecting Europe's market demand, geographic proximity and decarbonisation objectives.
- **These investments represent a major opportunity to help realise Africa's vast renewable potential**. This includes capitalising on the continent's strategic geographic position and building on its growing engagement in international climate negotiations to advance sustainable development.
- **However, the investments also raise important policy questions for African countries.** Policy-makers must assess the extent to which export-oriented investments align with Africa's energy access needs, energy security and sovereignty objectives, and green industrialisation strategies.
- **There is a risk of reinforcing extractive economic patterns.** Without deliberate policy choices, clean energy export projects may divert resources away from domestic and regional energy use and fail to deliver tangible benefits to local communities and vulnerable groups.
- **Proactive policy choices are needed to ensure that projects deliver on potential development opportunities.** If well designed and governed, clean energy exports can support jobs, technology transfer, skills development, industrial diversification and local economic growth.
- **Policy engagement is time-sensitive.** As many projects remain at their early stages, African policy-makers still have a window to influence contractual terms, regulatory frameworks and governance arrangements before financial closure limits flexibility.

Across the continent, a growing number of clean energy initiatives – from power generation to grid interconnections to renewable hydrogen projects – are being developed primarily to export energy, or energy-based commodities, to markets outside Africa

Introduction

Africa has some of the largest and most under-utilised renewable energy potential on the planet. For example, the continent holds 60% of the world's best solar resources but accounts for only 1% of installed solar photovoltaic (PV) capacity.[1] At the same time, it remains the continent with the lowest energy access rates: more than half of its population lacks reliable electricity,[2] constraining household welfare, industrial development and broader economic growth. Indeed, Africa's energy infrastructure remains structurally constrained. Inadequate generation capacity, limited transmission and distribution networks, and high costs leave many African economies vulnerable to both external and domestic shocks. Harnessing clean energy through investment is therefore critical to Africa's sustainable development.

It is against this backdrop that a new trend demands attention. Across the continent, large-scale clean energy projects are increasingly being developed not to serve African populations but to export energy (or energy-based commodities) to markets outside Africa.

'Clean energy' is understood here as electricity generated from low or spaces! zero greenhouse gas emissions sources including solar, wind, hydro and geothermal power, as well as battery storage and green hydrogen. For the purposes of this paper, a clean energy export project refers to any arrangement in which clean energy, or commodities produced using renewable electricity, is primarily destined for foreign markets. Related investments in transmission and distribution linked to clean energy are also included. In such arrangements, energy production contributes mainly to the decarbonisation objectives and energy demand of importing countries, rather than directly serving Africa's domestic energy needs.

The pipeline of clean energy export projects across Africa is substantial in both scale and ambition, even though most projects remain at early development stages. The scale of the investments involved, the long-lived nature of the infrastructure and the concentration of financing require deliberate and strategic engagement by African governments and regional institutions to ensure alignment with Africa's energy access, energy security and energy transition objectives. This is crucial as the African Union's (AU) Agenda 2063 explicitly anchors energy access, industrialisation and regional value chains at the core of the continent's long-term development strategy. Therefore, policy-makers must consider a fundamental question: on what terms, and in whose interest, are these projects being shaped?

This policy brief provides a preliminary and high-level synthesis of the emerging landscape. It identifies key risks and opportunities, and proposes concrete policy recommendations. It aims to generate and contribute to a discussion among African policy-makers, regional institutions and researchers on how best to navigate this evolving reality.

What is being built, and for whom?

This policy brief examines export-oriented initiatives across the value chain – from renewable power generation to the transformation of that energy into intermediate and final goods – in two main forms.[3] First, grid interconnection projects: submarine and overhead transmission lines designed to carry North African solar and wind electricity to European grids. Second, renewable hydrogen projects, in which renewable electricity is used to produce hydrogen and its derivatives, such as ammonia and fertilisers as well as other low-carbon commodities, primarily for export to Europe and Asia.

These projects vary significantly in scale and maturity, ranging from locally focused initiatives such as the Daures Green Hydrogen Village in Namibia to mega-projects like the Hyphen Hydrogen Project (also in Namibia) and Project Nour in Mauritania, which aim to install gigawatt-scale electrolysis capacity. Several initiatives are explicitly export-oriented, targeting demand in Europe and Asia, while a smaller number also emphasise domestic industrial decarbonisation and fertiliser production.

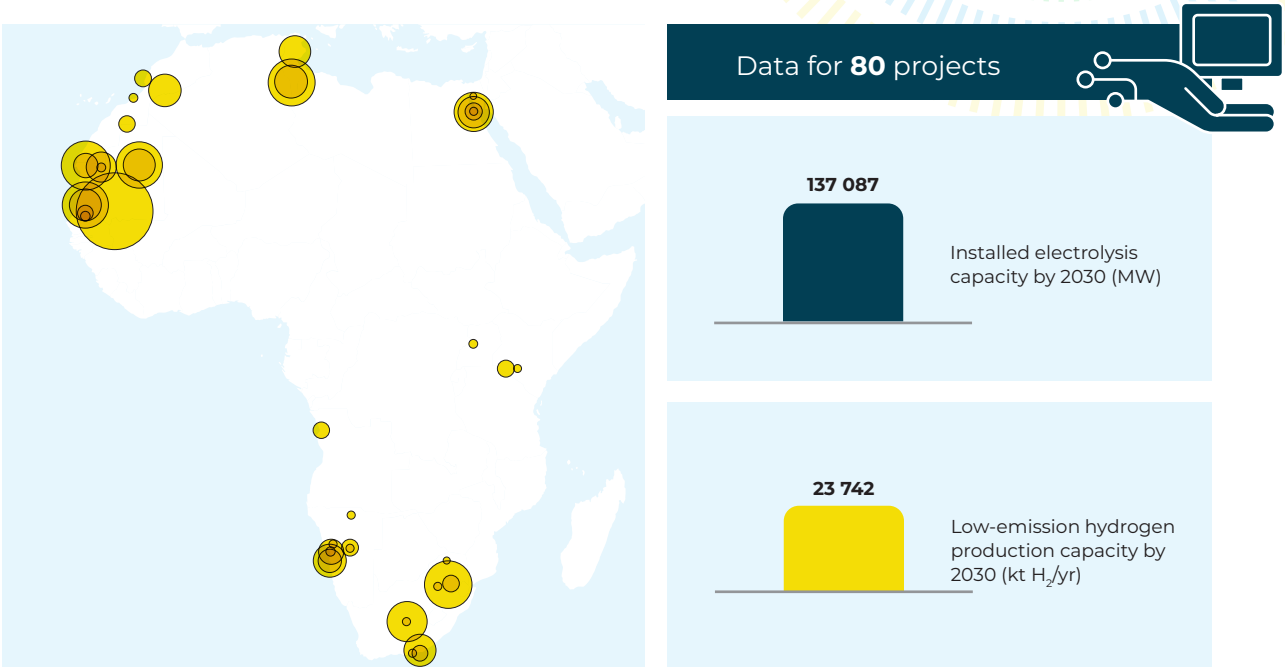
Grid interconnections

A series of electricity transmission projects aim to link North African renewable generation to European markets, largely through sub-sea cables crossing the Mediterranean. These range from the operational Morocco–Spain interconnections, with a third link under development, to more ambitious projects such as GREGY, connecting Egypt to Greece, and ELMED, connecting Tunisia to Italy. (A recently cancelled proposal sought to link Morocco directly to the United Kingdom.) Planned capacities range from several hundred megawatts to several gigawatts (GW), with combined investment requirements amounting to tens of billions of euros. According to Rystad Energy, by 2035, the European Union (EU) could import up to 24 GW of renewable electricity from North Africa, requiring more than US$27 billion in generation and transmission investment.[4]

Renewable hydrogen and derivatives

The International Energy Agency (IEA) tracks at least 80 renewable hydrogen projects currently planned across Africa, spanning pilot initiatives to gigawatt-scale ventures. Key producing countries include Angola, Egypt, Mauritania, Morocco, Namibia, South Africa and Tunisia. Export destinations are mostly European, with some interest also coming from Japan and South Korea. A central element of the planned infrastructure is the SoutH2 Corridor – a roughly 3 300-kilometre (km) pipeline linking North African production sites to demand hubs in Austria, Germany and Italy. Most projects remain at the feasibility stage and financing is largely unsecured; however, institutional momentum is significant.

Figure 1: Hydrogen projects in Africa



Source: IEA (2025)[5]

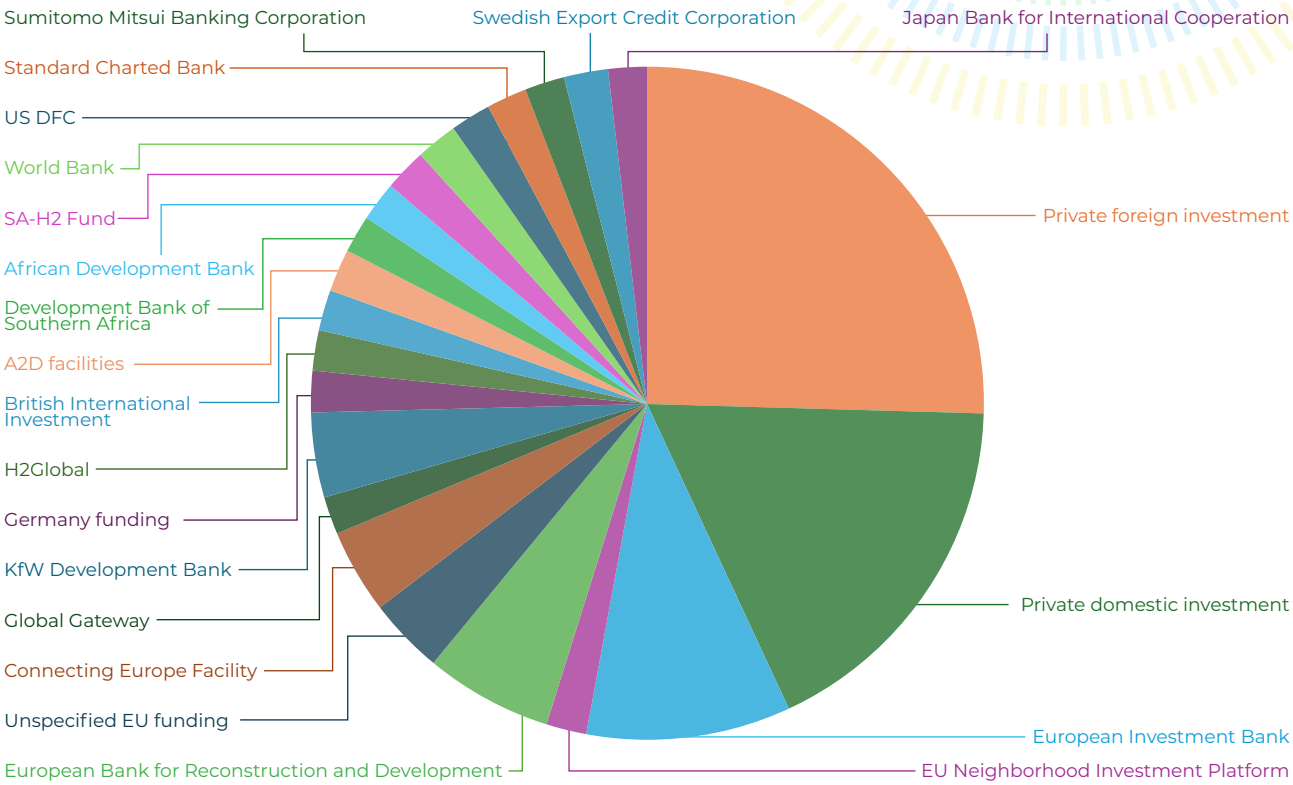
Who is driving these projects?

A review of funding structures and stakeholder profiles reveals a consistent pattern: the overwhelming majority of financing comes from European sources including the European Investment Bank, the European Bank for Reconstruction and Development, Germany's Kreditanstalt für Wiederaufbau (KfW), and a range of EU programmes and facilities. European private investors and energy companies also play a central role as project developers.

Figure 2 maps the stakeholders involved in financing one or more clean energy projects in Africa, based on the sample reviewed for the International Institute for Sustainable Development's (IISD) forthcoming report. However, the figure does not indicate the scale or relative magnitude of funding contributed by each stakeholder.

Meanwhile, Chinese engagement on the continent has focused primarily on domestic renewable energy infrastructure and information technology, rather than on renewable energy projects that are designed mainly for export. This does not mean that China has no stake in the export projects discussed here. As a world leader in renewable energy technology and manufacturing, much of the equipment deployed will likely originate in China – such as PV modules, wind turbines, components for electrolysers. Africa is an important producer and supplier of the mineral commodities needed in the production of renewable energy equipment, yet the majority of mineral processing and manufacturing still takes place in China. Mapping these mineral value chains to assess the extent of local value added and technology transfer as well as the policy implications these issues raise for African governments falls beyond the scope of this brief, but is an important area for further research.

Figure 2: Funding sources for clean energy export projects in Africa (sample of 14)



Source: forthcoming IISD report

African governments largely play an enabling role: providing land, permits, incentives and regulatory frameworks. While this is a necessary starting point, it falls short of the strategic leadership that the moment demands. Such leadership requires proactive policy choices to ensure that clean energy exports are designed and governed to support jobs, technology transfer, skills development, industrial diversification and local economic growth.

The source of funding matters beyond the finance itself. It shapes whose interests inform project design, whose risk frameworks set the terms and whose standards define acceptable outcomes. These are policy questions with which African policy-makers need to engage deliberately.

What is the legal architecture of these projects?

The legal instruments used in clean energy export projects generally follow a staged progression. At the early stages, memoranda of understanding (MoUs) are commonly signed between companies and, at a higher political level, between governments of exporting and importing countries. These non-binding instruments serve to signal intent, confer political endorsement and reassure prospective investors. Egypt alone has concluded more than 30 such MoUs related to renewable hydrogen.

As projects move forward, more binding contractual arrangements are introduced, including power purchase agreements, construction contracts and long-term offtake agreements. These instruments, however, are rarely made public. Confidentiality is particularly pronounced in hydrogen projects, where political sensitivity and the predominance of private or foreign investors create strong incentives for opacity.

Electricity interconnection projects tend to be better documented because they rely on public funding and formal interstate agreements. The renewable generation assets supplying their interconnections are typically developed by private and foreign investors and, by contrast, are largely invisible to public scrutiny.

The result is an asymmetry in access to information. Instruments that express political intent are relatively accessible, while those that establish binding obligations and allocate risks and benefits are not.

This lack of transparency has significant consequences. Without access to binding agreements, it is impossible to determine whether provisions on domestic energy allocation, local content, community benefit-sharing or technology transfer are included – and whether they are substantive or merely aspirational. More broadly, limited disclosure constrains the ability of African civil society, parliaments and researchers to scrutinise government commitments and assess the long-term implications of these projects.

Transparency standards that are well established in extractive sectors, such as those promoted under the Extractive Industries Transparency Initiative, offer relevant lessons for renewable energy export agreements. This is particularly the case where public land, environmental impacts, and the rights and livelihoods of local communities are at stake.

What are the key risks for Africa?

The emergence of clean energy export projects is not inherently problematic. But without deliberate policy action, three significant categories of risk could materialise.

Energy access trade offs

The most immediate risk is that export-oriented projects divert renewable energy capacity, financing and policy attention away from Africa's own needs. Building large solar and wind projects in countries where many populations still lack reliable electricity – and routing that energy to European markets – entails real opportunity costs. This concern is especially acute in North Africa, where most interconnection projects are planned, and where renewable capacity destined for Europe could alternatively strengthen regional electricity networks within Africa. Even in countries with relatively high electrification rates, prioritising export can perpetuate domestic fossil fuel dependence, leaving economies exposed to volatile global oil and gas markets, and to adverse climate, public health and environmental impacts. For example, Morocco, despite significant growth in renewable capacity and strong potential, still generates more than 60% of its electricity from coal.

Impacts on vulnerable communities

Many projects are located in rural or remote areas, sometimes involving land expropriation. These are precisely the regions with the lowest electrification rates, where populations are often poorest and have the least political voice.[6] In the absence of explicit policy requirements for local energy access[7] and benefit-sharing, communities hosting large-scale solar and wind installations may remain without power while energy is exported abroad. Renewable hydrogen projects introduce additional complexity: current electrolysis technologies require high-purity water, yet many such projects in Africa are planned in arid and water-stressed regions.

Competition over land and water use between industrial energy production and local communities for drinking water, agriculture and pastoralism therefore requires careful management. Nomadic and pastoralist communities warrant particular attention. Where renewable infrastructure is developed on lands that support seasonal migration routes, there is a risk of disruption that standard environmental and social impact assessments rarely capture.[8]

Limited local value addition

Major engineering, procurement and construction contracts tend to be awarded to large international firms,[9] limiting local participation in the most-value-generating stages of project development. African countries import virtually all the key components required for large-scale clean energy projects – including solar panels, wind turbines and electrolysers for renewable hydrogen – from China and Europe. Although some governments have introduced local content frameworks, implementation remains uneven, monitoring capacity is limited and enforcement is rare. The gap between policy ambition and operational outcomes in local content is well documented across Africa's extractive sectors,[10] and there is little reason to expect clean energy projects to differ in the absence of significantly stronger institutional frameworks.

How can clean energy export projects genuinely benefit Africa?

The risks outlined above are real but not inevitable. If African governments negotiate and enforce appropriate conditions, clean energy exports can make a meaningful contribution to development. While projections of transformative gains should remain cautious given uncertainties around delivery timelines, cost trajectories and market uptake, at least three concrete opportunities merit attention.

Export diversification

Export diversification represents the most significant structural opportunity. Africa's long-standing reliance on hydrocarbon and mineral commodity exports has constrained economic resilience. Clean energy exports, particularly hydrogen and its derivatives, offer a pathway towards higher-value, lower-carbon trade.[11] The development of green ammonia and fertiliser production capacity, especially, could open new industrial segments and build capabilities that extend well beyond the energy sector.

Technology transfer and skills development

The investment flows associated with these projects also carry potential for technology transfer and skills development, provided that governments negotiate actively for such outcomes. Clean energy infrastructure requires engineering, construction, maintenance and operational expertise. Breaking into manufacturing and component production can be challenging given the dominance of existing countries such as China. However, a large portion of jobs is in constructing new renewable projects and transmission infrastructure on site. Installation and commissioning include high demand for technicians and electricians, while operations and maintenance provide long-term, ongoing roles that last for the 25–30-year lifespan of a project.

Governments need to ensure that projects maximise local employment opportunities and build long-term productive capacity, rather than having all the skilled workers brought in from outside the country then leave after construction. A sufficiently large and well-structured project pipeline also creates leverage to negotiate training obligations, joint ventures and research partnerships. At the same time, governments need to provide education and training to support skilled workers to service to such projects.

Regional integration

Regional integration offers additional opportunities. If a share of green commodities produced for export is retained for intra-African trade, development benefits could be amplified. Africa currently imports fertilisers at significant cost. A regional green ammonia and fertiliser industry, anchored in Africa's clean energy potential, could reduce import dependency and support food security. Recent fertiliser supply disruptions triggered by Russia's war in Ukraine and more recently by the United States–Israel–Iran conflict have underscored the vulnerability and cost of continued dependence on external supply. More broadly, green industrialisation will increasingly need to be approached as a regional rather than a national project, given the scale and capital intensity required in segments such as electrolyser manufacturing, green fertiliser and ammonia processing. How to translate this into practical coordination across borders is a question that African policy-makers and regional institutions will need to work through together, building on frameworks such as Agenda 2063 and the African Continental Free Trade Area (AfCFTA).

What can be done to ensure clean energy export projects deliver sustainable development outcomes?

Ensuring that clean energy export projects also support the continent's development objectives and energy access priorities requires deliberate and timely action. The following preliminary recommendations outline areas where African policy-makers can take early steps.

Close the transparency gap

Governments should ensure that all agreements between public entities and project developers – including concession agreements, land-use contracts, offtake arrangements and government-backed guarantees – are publicly disclosed, subject to legitimate commercial confidentiality provisions. Developers should be required to report regularly on financial flows, employment outcomes, environmental performance and community benefit obligations. Greater transparency is essential to enable public oversight and informed policy-making.

Balance exports with domestic and regional energy access

Governments should establish regulatory frameworks that allocate a defined share of energy production or capacity towards domestic or regional consumption across all projects. This is particularly important where projects are sited near communities without reliable electricity. This obligation can take several complementary forms as part of broader benefit-sharing arrangements: direct electricity supply to host communities and districts; ring-fenced investment in national or regional grid connections, where appropriate in partnership with public utilities; and contributions to off-grid or mini-grid solutions, where host communities are not readily connectable to the main network. The appropriate mix should be calibrated

to the project's location and the state of local energy infrastructure. Energy access obligations should be embedded in project licensing, monitored and enforced by adequately resourced regulators, rather than left to voluntary developer commitments.

Require environmental and social impact assessments that include water security

Governments should require cumulative impact assessments that consider the combined effects of multiple projects on ecosystems, water resources, land use and livelihoods – explicitly including nomadic and pastoralist communities and taking into account gendered impacts. These assessments should go beyond standard project-level assessments, and should be conducted prior to project approval, involve meaningful community consultation and be made publicly available.

In this framework, particular attention should be paid to water security. Clean energy projects must not compete with local communities for potable water, and water-use permits in water-stressed areas should be subject to independent hydrological assessment, with priority given to reused or desalinated sources. Regulatory frameworks should explicitly prohibit configurations in which industrial water use for export-oriented energy production undermines local water access.

Strengthen and enforce local content and technology transfer provisions

Governments should negotiate and embed local content requirements (where feasible) across procurement, construction, operations, and maintenance processes within permits and investment contracts, including specific provisions for the use of local labour, skills development and technology transfer. These requirements should be aligned with national industrial policy frameworks, and supported by transparent monitoring mechanisms and meaningful consequences for non-compliance.

Align clean energy export projects with Africa's continental green industrialisation strategy

African regional institutions, including the AU, the African Development Bank and sub-regional economic communities, should establish structured policy dialogues to ensure that clean energy export projects are assessed against and contribute to the continent's green industrialisation and renewable energy priorities.[12] Continental standards on local content, transparency and benefit-sharing should be anchored within a broader strategic framework that links export activities to domestic and regional industrial development. The AfCFTA offers a practical platform to promote intra-African trade in clean energy–based goods and to strengthen regional value chains.

Implications for European partners

Although this brief is addressed to African policy-makers, the dynamics it describes also carry implications for European partners. The current model – in which European institutions finance, European firms develop, and European markets absorb the output of Africa's clean energy export projects – may deliver short-term decarbonisation gains for Europe, but its longer-term sustainability is far from assured. Partnerships that are perceived as extractive tend to erode the political legitimacy on which they depend, and the goodwill that Europe has built on climate cooperation over the past decade cannot be assumed to be permanent. This is particularly salient at a moment when Europe's external energy strategy is increasingly shaped by internal energy security considerations.

There is, accordingly, a shared interest in reshaping these arrangements. The question is where that reshaping matters most. The transmission line and the electrolyser define the export architecture, but it is the upstream renewable generation capacity, together with the grids and system integration investments that accompany it, that holds the greatest potential for African development gains. Cooperation models that explicitly support African industrialisation objectives, advance intra-African energy and value chain integration, and embed meaningful transparency and benefit-sharing standards are not concessions to African demands: they are conditions for the durability and credibility of the partnership itself.

Conclusion

The global energy transition is reshaping trade flows, investment dynamics and geopolitical relationships in ways that have direct implications for Africa. The clean energy export projects emerging across the continent are early expressions of a new economic order in which Africa's renewable resources will play an increasingly significant role. The central question for African policy-makers is not whether to participate in this order, but on what terms.[13] The findings presented in this brief are preliminary, and a more comprehensive empirical picture will require further research.

That said, the trends identified suggest that current trajectories carry a risk of reproducing extractive scenarios:[14] external capital shaping the use of African resources through governance arrangements that do not sufficiently centre African development priorities. The green character of the commodities may reduce externalities compared to fossil energy investments (emissions of carbon and toxic air pollution) but does not alter the economic benefit-sharing dynamic if the underlying governance architecture remains weak. In addition, the same safeguards are needed across all projects to protect local communities, natural resources and ecosystems.

At the same time, this preliminary analysis points to a genuine – though conditional – opportunity. Africa's vast renewable potential, strategic geographic position and growing engagement in international climate negotiations create real scope for more favourable terms of participation. Most of the projects reviewed have not yet reached financial closure, and the contractual and regulatory frameworks that will govern them are still being defined. Decisive, coordinated action from policy-makers across the continent can turn the current uncertainty into a gamechanger for Africa's development, energy sovereignty and clean energy transition.

Acknowledgements

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2 United Nations Trade and Development (UNCTAD) (2024) *2024 Economic development in Africa report: Overview.* Geneva: UNCTAD. Available at **https://unctad.org/system/files/official-document/aldcafrica2024-overview_en.pdf**

3 There may be other configurations such as projects that use clean electricity to produce green steel or other export oriented industrial commodities.

4 Thaikoottathil ND & Selvaraju K (2024) It takes two: North Africa–Europe interconnectors could deliver 24 GW of clean energy. Rystad Energy. Available at **https://www.rystadenergy.com/news/north-africa-europe-interconnectors**

5 IEA (2025) Hydrogen production projects interactive map. Available at **https://www.iea.org/data-and-statistics/data-tools/hydrogen-production-projects-interactive-map**

6 The Noor Ouarzazate solar complex in southern Morocco illustrates these dynamics. Developed on land historically used by Amazigh pastoralist communities, the project has been associated with reports of inadequate consultation and compensation, while the electricity generated flows to the national grid and, increasingly, towards export markets. See Leonard et al (2024).

7 Energy access may be delivered through off-grid or decentralised solutions, where appropriate.

8 Haag L (2022) Environmental colonialism in the Maghreb? Harnessing green energy on indigenous peoples' land. The Swedish Institute of International Affairs, UI brief 10/2022. Available at **https://www.ui.se/globalassets/ui.se-eng/publications/ui-publications/2022/ui-brief-no.-10-2022.pdf**

9 See AfDB (2021), which documents the concentration of engineering, procurement and construction and other high-value contracts in international firms across African extractive sectors, despite local content policies.

10 Toroskainen K (2019) Resource governance index: From legal reform to implementation in sub-Saharan Africa. Natural Resource Governance Institute. Available at **https://resourcegovernance.org/sites/default/files/documents/rgi-from-legal-reform-to-implementation-sub-saharan-africa.pdf**

11 The majority of green hydrogen initiatives currently under development in Africa are concentrated in a small number of countries and are primarily oriented towards export markets, underscoring the importance of aligning project design with domestic and regional development objectives. See GIZ & Africa Green Hydrogen Alliance (2025).

12 Key strategic documents include: African Union Commission (2015) *Agenda 2063: The Africa We Want*; African leaders, *The African Leaders Nairobi Declaration on Climate Change and Call to Action*, Africa Climate Summit, Nairobi, 4–6 September 2023; African Energy Commission (AFREC) (2021) African Energy Transition Programme; and ECOWAS Authority of Heads of State and Government (2013) ECOWAS Renewable Energy Policy (EREP), 43rd Ordinary Session, Abuja, July 2013.

13 See ACF (2025), which highlights that Africa's energy transition choices over the 2025–2030 period will be decisive for whether external clean energy investments reinforce structural dependency or support domestic industrialisation, energy access and long-term economic transformation.

14 Recent analysis of Africa's emerging green hydrogen sector cautions that under current geopolitical and investment structures, export-oriented renewable energy projects risk reproducing extractive economic dynamics unless stronger governance frameworks, domestic value creation requirements and technology transfer provisions are embedded at early stages. See Dagnachew et al (2024).

Additional reading

Full references, including project-level citations, are provided in the forthcoming IISD research paper. The key sources informing this brief include:

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2

Taking the wheel: Steering Africa through the risks and opportunities of maritime decarbonisation

Richmond Boakye Dankwah and Liz May

Summary

Global shipping contributes 3% of global greenhouse gas emissions, and efforts to decarbonise the sector are accelerating. The European Union (EU) is implementing two unilateral measures – an emissions trading system (the EU ETS) and the FuelEU Maritime Regulation, which are already having significant impacts. The International Maritime Organization (IMO) is considering a ground-breaking new global set-up, the Net-Zero Framework (NZF), with new proposals being put on the table and an important decision point meeting scheduled for November 2026.

Maritime transport handles 90% of the African continent's international trade by volume, driven by a reliance on bulk commodity exports and food imports

For Africa, the stakes are uniquely high. Maritime transport handles 90% of the continent's international trade by volume, driven by a reliance on bulk commodity exports and food imports.[1] African nations already pay substantially higher prices for sea freight than the global average. There is no doubt that global and unilateral decarbonisation initiatives will add further cost and complexity to this difficult landscape, with potentially serious consequences for food security and longer-term economic development. Alongside these challenges, there are opportunities to leverage growing demand for green fuel and transport hubs, as well as potential revenues, to advance Africa's own green industrialisation ambitions.

Conclusions

- Africa will be disproportionately impacted by maritime decarbonisation.
- Negative impacts are likely to be generalised, particularly affecting vulnerable net food and fuel importing economies, while opportunities are more concentrated among already-industrialising countries.
- Costly duplication of initiatives must be avoided.
- Consideration must be given to the scale, governance and scope of any mechanism established to distribute funds resulting from decarbonisation initiatives.
- Maritime decarbonisation does present opportunities for Africa to further its green industrialisation ambitions, but realising these opportunities will require strong leadership, supportive green industrial policy frameworks and policy space.

Recommendations for African policy-makers

- Urgently conduct country-level risk and opportunity assessments, including identifying priorities for the use of decarbonisation funds.
- Approach IMO negotiations and discussions with the EU and other trading partners implementing unilateral measures with a unified position and clear demands, building on the assessment above.
- Avoid the duplication of measures. African support for any global measure could be made contingent on securing binding assurance from trading partners that obligations under unilateral initiatives will cease.
- Consider assessing the various proposals being put forward against a set of common principles:
  - Recognition: there needs to be recognition that maritime decarbonisation measures will have a disproportionately negative effect on African economies. This needs to be considered in the context of the African shipping sector's minimal contribution to global emissions.
  - Revenue: measures must include an effective mechanism to offset this disproportionate impact.
  - Addressing impact: the resources generated must be specifically mandated to support not just the poorest but also the most affected economies, and must be able to target wider areas of impact beyond the shipping sector.
  - Voice: there must be a clear and ongoing role for African countries in the governance of revenue dispersal mechanisms.
- Continue to develop supportive green industrial policy frameworks and advocate for policy space to enable technology transfer and prioritise skills development in order to take advantage of the opportunities created by maritime decarbonisation.

This is a pivotal moment for Africa policy-makers. If the continent remains passive, it will absorb the costs of global decarbonisation without influencing its direction. But if it mobilises and leads with a unified voice, it can turn this transition into a source of support for green industrialisation.

Introduction

Maritime decarbonisation initiatives will have significant impacts on African countries; however, much of the analysis has been at a highly aggregated or highly technical level. The first section of this policy brief outlines the main policies being implemented or under consideration, as well as Africa's priorities. The next section synthesises the impact research that is already in the public domain, taking a specifically African lens. The brief then evaluates the potential opportunities presented by the various frameworks. Finally, the paper presents recommendations for how African policy-makers can navigate the risks and harness the opportunities in order to accelerate Africa's own green industrialisation and maritime transformation ambitions.

State of play in maritime decarbonisation initiatives

Maritime decarbonisation is currently being shaped by three primary initiatives that have a complex relationship: the International Maritime Organization's (IMO) proposed Net-Zero Framework (NZF), the European Union (EU) Emissions Trading System (EU ETS) and the FuelEU Maritime Regulation. To avoid duplication, the EU will consider withdrawing its unilateral measures in favour of the global NZF, but only if it deems there is a risk of 'significant' double taxation. Should the EU decide that this bar has not been reached but the NZF passes in some form, shipping companies will have to comply with multiple costly overlapping regulations.[2] This section outlines the main features of the various initiatives.

The IMO NZF

In 2018, members of the IMO, the United Nations' (UN) specialised agency, agreed to the *Initial IMO Strategy on Reduction of GHG Emissions from Ships*. In 2023, they added concrete goals, pledging to reduce emissions by at least 20% by 2030 and 70% by 2040 and to reach net zero emissions by 2050. The next two years were spent designing and evaluating a mechanism through which these reductions would be achieved, and in April 2025, members reached initial agreement on the NZF.

The Framework was the result of difficult compromises, balancing effectiveness, speed and ambition with possible impacts on the sector and on different economies, as well integrating initial attempts to map out how the income generated would be utilised. While some members were disappointed at the lack of climate ambition, the NZF breaks new ground in global decarbonisation as the first and only robust sector-led plan with a clear economic component.

The Framework was widely expected to be formally adopted at the IMO's extraordinary session in October 2025 but a combination of pressure from the United States (US) and a lack of committed buy-in from a number of IMO members led to the final discussions on adoption being put 'on ice' for a year. Various countries are submitting new ideas and proposals, and the IMO will return to the matter in November 2026. In the meantime, work on the implementing guidelines continues at a technical level.

The main components of the NZF are:

- A global fuel standard that requires ships to gradually reduce their fuel's extent of pollution (i.e. how much greenhouse gas (GHG) is emitted for each unit of energy used, across a fuel's life cycle).
- A pricing mechanism that set prices on a share of the GHG that ships emit, to encourage the industry to lower emissions to comply with the global fuel standard.[3]
- The IMO Net-Zero Fund, which will manage the revenue generated. According to the Framework's current draft Regulation 41, the fund (roughly expected to collect US$10–15 billion annually) is mandated to support a 'just and equitable transition'. It seeks to do this through: zero-emission rewards; support for in-sector infrastructure; technology and training; and socio-economic mitigation to support small island developing states (SIDS) and least-developed countries (LDCs) to offset potential increases in maritime transport costs and to protect food security.

Given the current impasse, there are (at least) three possible outcomes of this process. Each of these – including the status quo of a continuation of the EU's unilateral measures – has costs and implications for Africa:

- The NZF is adopted as is in November 2026;
- The NZF is adopted with some modification or pending the approval of some modifications. Chief among these is the idea that the economic or pricing measures would be dropped; or
- The NZF is rejected or postponed indefinitely.

African participation at the IMO

The implementation of the IMO's NZF would have important consequences for African countries that need to be fully understood to enable positions to be taken at the IMO. African members of the International Civil Aviation Organization (ICAO), the UN's specialised agency for aviation, have taken a proactive and unified stance, led by the African Union (AU) Commission. In contrast, there has been relatively low participation of African members at the IMO, with uncoordinated and divided positions and limited engagement from the AU Commission.[4]

There are some structural reasons for this. Of the 37 African members of the IMO, there are only six with permanent representation. Regarding key votes, only members who have ratified MARPOL Annex VI on the prevention of pollution from ships are theoretically allowed to vote on the NZF, which in the case of Africa is 18 out of the 37 members. In April 2025, a majority of African countries abstained in the vote to agree the NZF, and in October 2025 a majority of African countries voted to adjourn discussions. This position likely reflects concerns about possible impacts and a lack of clarity about the channels to mitigate this. The pause marks a critical chance to reorganise, strategise and build collective capacity.

Table 1: How African countries voted on the NZF

	Yes to NZF	No to NZF	Abstained	Total votes
April 2025 vote	4	2	6	12/37
	No to pause	**Yes to pause**	**Abstained**	**Total votes**
October 2025 vote	4	16	5	25/37

Source: authors' analysis based on official IMO documents

The EU ETS

The EU ETS is a cornerstone of the EU's strategy to mitigate climate change. The system was extended to include the maritime sector as of January 2024. Operating on a 'cap and trade' principle, the EU ETS sets a ceiling (cap) on GHG emissions, which is converted into tradable permits known as EU Allowances (EUAs). The cap is reduced annually to drive down total emissions.

Shipping companies are now required to monitor, report and surrender a sufficient number of EUAs to cover their annual emissions; failure to do so results in significant financial penalties. The system has been phased in gradually: shipowners were required to cover 40% of their emissions for 2024, 70% for 2025 and 100% from 2026. For voyages between EU and non-EU ports, only 50% of emissions are subject to these requirements.

Since 2013, the whole EU ETS, which also covers electricity, industrial processes, aviation and power generation, has generated approximately US$175 billion in revenue, which is channelled into the EU Innovation Fund to support industrial decarbonisation initiatives within the EU. The maritime extension is expected to generate an additional US$40 billion, representing a net transfer of resources from Africa to the EU.[5]

The UK's emissions trading system

As part of a broader commitment to align with the EU ETS, the United Kingdom (UK) has announced that its own emissions trading system (the UK ETS) will be extended to include shipping from 1 July 2026. The first set of reports are due by the end of March 2027. It will follow a very similar format to the EU's, and application to international shipping will begin in 2028.

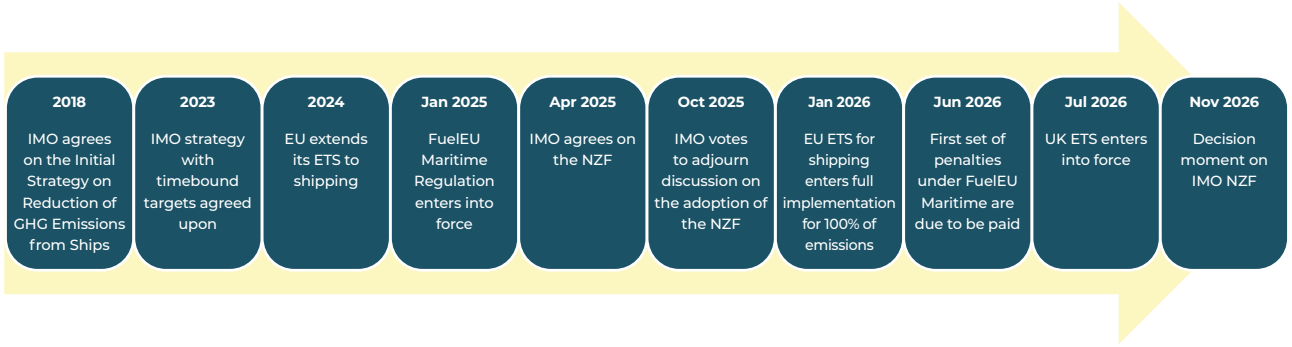
The FuelEU Maritime Regulation

The FuelEU Maritime Regulation entered into force on 1 January 2025. It requires ships to reduce the GHG intensity of their fuel (including carbon dioxide, methane and nitrous oxide) in phases, by:

- 2% in 2025–2029
- 6% in 2030–2034
- 14.5% in 2035–2039
- 31% in 2040–2044
- 80% from 2050 onwards

From 1 January 2030, container and passenger ships must also connect to onshore power while at berth in major EU ports. For voyages between EU and European Economic Area ports, companies must account for 100% of the energy they use. For voyages between EU and non-EU ports, companies must account for 50% of the energy used. There are some built-in compliance balancing flexibilities – for example, if a ship owner complies one year, they can save the surplus for the next, and ships can pool together to bring the average of a group into compliance. These measures favour larger shipping groups. Companies must have submitted their first verified FuelEU reports by the end of January 2026, and they have until the end of June 2026 to pay any penalties.

Figure 1: The acceleration of maritime decarbonisation initiatives



Source: Authors' compilation

African maritime policies and priorities

Decarbonisation initiatives for the global shipping sector must be assessed in relation to their ability to support – not undermine – Africa's own maritime strategies and green industrialisation policies. These initiatives prioritise modernising the shipping sector, increasing Africa's share of global ship ownership, electrifying ports and improving green port infrastructure and backward linkages, as well as developing greener maritime fuel supply chains.

- The **African Maritime Transport Charter**, which was first agreed upon in 1994 and revised in 2010, is a legally binding treaty that creates a common foundation for maritime policy across AU member states. It focuses on harmonising regulations to enable the development of African fleets and the transition to digital and green ports.
- The **2050 Africa's Integrated Maritime Strategy (AIMS)**, adopted in 2014, focuses on the idea of the 'blue economy' in Africa and the creation of the Combined Exclusive Maritime Zone of Africa (CEMZA). It aims to improve maritime security to protect high-value green energy infrastructure.

- The **Africa Green Industrialisation Initiative (AGII)**, launched in December 2023, aims to leverage US$100 billion in investment to accelerate renewable-powered industries across Africa and establish the continent as a hub for green value chains including minerals and green fuels. In terms of shipping, the AGII seeks to develop the energy and infrastructure needed for green shipping corridors where low-carbon exports are transported using ships that are powered by green shipping fuel that has been onboarded at African green global bunkering hubs.

Existing analysis on the impact of maritime decarbonisation on African development

While there has been a substantial amount of research into the potential impacts of the various maritime decarbonisation initiatives, little has focused specifically on Africa, and where it has, the analysis has tended to be either highly aggregated or highly technical. This section aims to synthesise and make accessible the relevant findings from existing work, through a specifically African lens. The studies covered include the UN Conference on Trade and Development's (UNCTAD) comprehensive impact assessment (CIA), commissioned by the IMO; modelling work by the Africa Policy Research Institute (APRI) and partners; a series of African case studies from the Leading Effective Afrocentric Participation (LEAP) project at the University College London (UCL); UCL work focusing on food security; and a case study of an impacted shipping company.

Taken together, these studies point to modest decreases in gross domestic product (GDP) across a wide range of African countries. The research shows significant impacts on maritime transport–dependent import and export sectors as well as serious concerns regarding household incomes and food security, particularly for net food and fuel import-dependent countries.

Early impacts of the EU ETS and the FuelEU Maritime Regulation

Now that they are fully operational,[6] the EU ETS and the FuelEU Maritime Regulation are already having an impact on trade costs for African economies. In order to pass on compliance costs to cargo owners, shipping companies that operate on routes connecting Europe and West Africa have started to impose explicit emissions surcharges on goods. For instance, Maersk announced an emissions surcharge of roughly EUR 223 per 20-foot container and EUR 446 per 40-foot container on routes connecting the two regions.[7] Instead of being absorbed by carriers, this surcharge is paid for by importers and exporters, thereby raising African freight costs. Surcharge levels on African routes appear disproportionately high when assessed on a per-nautical-mile basis[8] and, in some cases, exceed the underlying carbon cost implied by EUA prices.[9] This suggests that the EU ETS has created opportunities for rent capture by shipping companies.

The implementation of FuelEU Maritime Regulation has led to higher costs as ship operators have to source more expensive sustainable fuel. Costs are already high and the 80% requirement from 2050 onwards could prove very difficult for smaller companies, particularly if sustainable fuel production does not ramp up. Higher fuel costs and the imposition of surcharges leading to higher freight costs have direct implications for port activity, trade competitiveness and the affordability of essential imports such as food and fuel. Inflationary and food security risks are particularly acute in import-dependent economies.[10]

With no specific mechanisms to assist impacted trading partners,[11] revenues from the EU ETS – including those from maritime transportation – are kept in the EU and directed towards domestic climate and innovation priorities.

Case study: Africa Express Line

Africa Express Line (AEL) operates specialised refrigerated cargo vessels transporting fruit exports from Cameroon, Côte d'Ivoire, Ghana and Senegal to European markets.[12] According to operational data discussed with AEL's management, compliance with the EU ETS resulted in carbon costs of approximately EUR 2.5 million in 2024, rising to EUR 3.8 million in 2025 as the scheme phased in. Beyond direct costs, the trading system imposes substantial administrative burdens, requiring dedicated staff to manage compliance, purchase allowances through brokers and monitor emissions reporting.

The FuelEU Maritime Regulation further escalates these pressures by mandating annual reductions in the carbon intensity of marine fuels. For AEL, compliance requires purchasing B30 biofuel blends, which are significantly more expensive than conventional marine fuels and are procured through complex and opaque supply chains. The company projects that FuelEU compliance could cost EUR 5 million for the period 2025–2029. These regulatory costs are largely passed through supply chains in the form of fuel surcharges, which ultimately affect the competitiveness of African agricultural exports in European retail markets.

The proposed expansion of the UK ETS to include maritime transport would magnify these existing pressures. A significant number of Africa-bound and Africa-origin voyages call at UK ports directly or connect via transshipment hubs that involve the UK. As a result, the operators that are already complying with EU ETS requirements could become subject to an additional, parallel carbon pricing regime. This would broaden the geographical scope of regulatory exposure and increase cumulative compliance costs for shipping lines serving African trade routes.

While alignment between the UK and the EU emissions trading systems may reduce some administrative complexity, operators may still face multiple reporting and compliance systems if full integration is not achieved. For smaller or specialised operators such as AEL, this layering of regulatory regimes increases both fixed and variable costs, intensifying competitive pressures in the maritime sector. One of the most significant implications of expanded carbon pricing lies in its potential to distort shipping routes and port utilisation patterns. The UK ETS consultation acknowledges the possibility that operators may alter voyage patterns to reduce emissions liabilities including adding or removing port calls to optimise compliance. For African exporters, such changes could reduce the frequency of direct shipping services, increase reliance on transshipment hubs and extend transport times. These effects are particularly damaging for perishable goods, where delays directly translate into quality loss, increased spoilage risk and higher logistics costs.

AEL's management also highlights the structural competitive disadvantages faced by Africa-focused shipping operators under the current regulatory frameworks. Unlike many Latin American exporters, whose trade networks are often diversified across multiple global markets, African fruit exporters remain heavily dependent on European demand. This dependence increases their exposure to EU and potentially UK climate regulations. Furthermore, smaller specialised reefer shipping companies typically lack the capital resources required to invest in new vessel technologies, alternative fuels or large-scale fleet modernisation. As carbon pricing and fuel regulations tighten, large container shipping lines with greater financial capacity are better positioned to adapt, potentially leading to market consolidation and reduced competition. This trend raises broader concerns about the future of specialised reefer shipping services.

If regulatory pressures accelerate the shift towards large container vessels carrying refrigerated containers, Africa's export logistics could become less flexible and less tailored to agricultural supply chains. Reduced competition among shipping providers may increase freight costs, weaken service reliability and ultimately reduce the competitiveness of African exporters in European markets.

Modelling the potential economic impacts of a carbon levy on African countries

Economic modelling conducted by APRI, the Firoz Lalji Institute for Africa at the London School of Economics and Political Science (LSE) and the African Future Policies Hub assessed the impact of introducing a simple fixed shipping levy (or carbon tax) with a price of US$100 per tonne of carbon. The NZF proposal currently on the table has a more complex approach combining a fuel intensity standard with a pricing element that would mean that transport cost increases – particularly initially – would be smaller than those estimated. Nevertheless, the study offers valuable insights into how a decarbonisation framework with a strong economic element could impact African economies over time.

The modelling suggests that the introduction of a global shipping carbon tax would result in modest reductions in GDP across most African countries,[13] accompanied by increases in commodity prices and declines in real household incomes. Food prices are particularly sensitive to higher maritime transport costs, reflecting Africa's dependence on seaborne imports for staple goods. While aggregate GDP effects are small in percentage terms, the impacts are cumulative, interacting with pre-existing structural vulnerabilities such as food insecurity, high import dependence and balance-of-payments constraints.

Key outcomes from the modelling include the following observations:

- The majority of African economies would experience GDP declines ranging from –0.103% in Ethiopia to –0.117% in Egypt to –0.121% in Equatorial Guinea. Nigeria's GDP would decline by –0.043%, while Ghana's GDP would contract by about –0.085%. These numbers stand in contrast to results in economies that are more diversified, such as South Africa's, which would see a very marginal GDP increase of 0.009%. This divergence highlights the importance of economic structure, with regional trade connections and industrial diversification providing some protection against rising international shipping costs.
- The effects on household income would be more noticeable than changes in GDP would indicate. Household income would decline by more than 0.1% in a number of African nations such as Ghana (−0.101%), Equatorial Guinea (−0.106%), Ethiopia (−0.115%) and Egypt (−0.123%). In contrast, developed regions would experience smaller declines in household income, with the US experiencing a decline

of –0.040% and the EU experiencing a decline of –0.041%. Given Africa's small share of global shipping emissions, these discrepancies show a regressive distribution of welfare impacts, with African households suffering disproportionately.

- While exports would rise slightly by about 0.21%, aggregate African imports would decrease by about 0.04%. Sectoral stress is hidden by these aggregate numbers, with a number of nations potentially seeing a decline in agricultural commodity imports, including Morocco (–0.011%), Nigeria (–0.029%), Ghana (–0.075%) and Ethiopia (–0.198%). Most African economies would also see a decline in imported processed foods, with Nigeria and Ghana seeing declines of 0.078% and 0.146%, respectively.
- Global price effects reinforce the implications for food security. According to the modelling, increased shipping costs would raise the global prices of processed foods by roughly 0.013% and agricultural products by roughly 0.011%. Even though these price increases seem minor, they have significant economic ramifications in the African context, where a considerable portion of household expenses are related to food.

Assessment and limitations of the UNCTAD CIA and its implications for African states

At the request of the IMO, the UNCTAD's CIA evaluated the economic and distributional consequences of the proposed IMO mid-term GHG reduction measures using four policy scenarios. These scenarios combined or isolated the various technical and market-based instruments under consideration such as standards for fuel intensity, levy-based mechanisms and hybrid approaches.[14] [15] The final proposed design of the IMO NZF does not reflect any of the CIA scenarios entirely; rather, it combines a declining global fuel intensity standard, which is an economic pricing element, along with some broad rules for redistributing revenue. However, the CIA contains some useful analysis about the impact of different types of mechanism on African economies.[16]

- **Fuel intensity standards** were found to increase fuel and compliance expenses leading to higher shipping costs or freight rates for African countries.[17] This is similar to the impacts already seen with the introduction of the FuelEU Maritime Regulation. Flexibility mechanisms such as the ability to pool and trade compliance units can reduce compliance costs for operators with access to efficient fleets and financial capacity. Even so, African shipping interests are less able to benefit from these mechanisms due to limited fleet size, older vessels and weaker participation in compliance markets. This approach alone does not generate any revenue that could be used to offset costs.
- The **economic measures** assessed included levies at various rates and a feebate system. Levies operate as a simple tax on emissions, set at different rates and therefore generating a larger or smaller revenue pool. The feebate was a circular proposal where a fee would be charged per tonne on the emissions of conventional fuels used, and that revenue would be put into a fund to subsidise the higher cost of low or zero emission fuels. The levy models were favoured by climate campaigners and some countries that are highly affected by climate change as having the most direct impact on emissions reduction:
  - **Levy**: the introduction of a levy was found to lead to moderate increases in freight rates and import prices for African countries, particularly affecting food, fuel and manufactured goods. Even at relatively modest rates (US$30–120), Africa's high dependence on shipping and long trade distances escalates its effects. Bulk, low-value exports and essential imports are especially sensitive to these cost increases. A high levy produced the largest short-term economic impacts for Africa, with shipping costs rising sharply, leading to higher import prices, reduced trade volumes and weakened export competitiveness. Import-dependent economies face heightened risks to food and energy affordability, while landlocked and the least-developed African countries experience amplified burdens due to already-high transport costs.

- **Feebate (fee and reward)**: this system collects fees on emissions and distributes rebates based on the uptake of eligible e-fuels. The economic mechanism in the proposed NZF operates broadly on this principle, with ships that fail to meet targets paying for remedial units and ships that outperform the target able to earn surplus units. However, the NZF diverges from the original feebate proposal put forward by proposing that the revenues generated be channelled to a fund rather than recovered into the system between ships. It was found that under the original feebate, given limited access to capital, infrastructure and the ability to develop e-fuel supply chains, African operators and ports were less likely to benefit from rebates, while still bearing higher freight costs. As a result, this redistribution mechanism risked favouring early adopters in developed regions, reinforcing technological and financial asymmetries. This weakness has been addressed in the design of the NZF currently on the table.

- Without an economic component, **revenue distribution** is not possible in the NZF, which is an important consideration for African countries. The CIA recognised the importance of generating revenue for mitigating regressive impacts on developing countries.

Insights from the LEAP project's country case studies

Along with economy-wide modelling results, UCL and African partners have conducted in-depth quantitative country-level case studies that highlight how decarbonisation initiatives might affect specific sectors. The Leading Effective Afrocentric Participation (LEAP) project models different policy and speed reduction scenarios over the short, medium and long terms. As with the UNCTAD CIA, the scenarios do not match the exact policy configuration being negotiated at present; however, they offer indicative trends and approximate assessments of the associated cost exposure and show how overall effects can lead to pressures in specific sectors.[18] The analysis shows very similar trends irrespective of the different scenarios.

The case studies particularly highlighted problematic sectoral impacts. The findings indicate that these impacts are attributable both to higher shipping costs (including the payment of carbon price, more expensive fuels, additional investment onboard ships) and to longer travel times at sea, which negatively affect the quality of perishable goods. Across all the case studies, sectoral cost effects were found to be much higher than effects on GDP. This emphasises the need for countries to conduct granular sectoral analysis, getting beyond headline figures to understand the impact of decarbonisation initiatives on nationally strategic sectors and those prioritised as part of industrialisation strategies.

- In the Malawi case study, findings indicate that fertiliser and petroleum imports may face cost escalations of up to 20% in the long term. Malawi is heavily dependent on imported fertilisers to grow crops, so these price hikes would have effects on food production, rural incomes and food security.
- In the Namibia case study, the cost of importing oil could increase by as much as 8.8%, the cost of exporting fish by as much as 4.3% and the cost of exporting uranium by as much as 1.1% in certain instances. Different effects are due to variations in the freight cost shares of different goods, with bulk, lower-value or fuel-intensive goods more affected by shipping cost increases than higher-value exports.
- In the Nigeria case study, costs of crude oil exports could rise by 4% in the long term, with a significant acceleration between the short- (2030) and medium-term (2040). Petroleum Motor Spirit and herbicide imports costs could increase by up to 3.7% and 10%, respectively. Sesamum seed exports could cost around 5.5% more.

Table 2: The sectoral impacts of possible maritime decarbonisation initiatives in select African countries

Country	Commodity	Trade type	Range across all scenarios
Malawi	Fertiliser	Import	~ 18–20%
Malawi	Petroleum	Import	~ 18–20%
Malawi	Tobacco	Export	~ 5–6%
Namibia	Petroleum	Import	~ 8–9%
Namibia	Fish	Export	~ 4–4.4%
Namibia	Uranium	Export	~ 1%
Nigeria	Crude oil	Export	4%
Nigeria	Sesamum seeds	Export	5.5%
Nigeria	Petroleum Motor Spirit	Import	3.7%
Nigeria	Herbicide	Import	10%

Note: ~ refers to approximates.
Source: LEAP project country case studies[19]

The food security risks and implications of maritime decarbonisation for Africa

One of the most critical concerns is the impact of maritime decarbonisation on food security, particularly in regions that rely heavily on seaborne trade. Various food security risk analyses demonstrate that rising shipping costs could disproportionately affect developing economies. When linked to broader structural vulnerabilities, the research shows that Africa is particularly exposed due to its reliance on maritime trade for both food imports and export-led agricultural growth.[20]

Marie Fricaudet, Flavia Fabiano and Tristan Smith's 2025 analysis offers a detailed evaluation of the potential impact of IMO mid-term measures on food security in structurally vulnerable states. The study goes beyond modelling overall GDP and trade flows to create a composite food-security-vulnerability index that combines three structural factors: (a) reliance on cereal imports; (b) the rate of poverty; and (c) pre-existing food insecurity (measured by indicators of undernourishment and obesity). This framework provides a more distributionally sensitive perspective for evaluating the welfare consequences of maritime decarbonisation.

The study shows that SIDS and LDCs are highly vulnerable to rising maritime transport costs. Many of these countries rely on imported staple foods, and even small rises in import prices can have disproportionately large effects on welfare. This is because a major part of household income is spent on food, and governments have limited fiscal space for subsidies. Importantly, the study compares its vulnerability index to UNCTAD's CIA, which models how changes in agricultural import prices would

happen under different IMO policy scenarios. This comparison shows that without factoring in structural vulnerability, GDP indicators alone tend to underplay overall economic effects.[21]

The study pinpoints a misalignment between countries that are vulnerable to food insecurity and countries that are able to absorb in-shipping-sector revenue. It uses a proxy measure of 'techno-economic potential' in shipping, which looks at factors such as fleet ownership, port infrastructure and the potential for fuel production. The study finds that the countries that could benefit the most from investment in the sector are not the ones that are most at risk of food price shocks. The capacity to utilise this investment is instead concentrated in a limited number of states with robust maritime infrastructure and accessible capital. This has direct consequences for the governance structure of any NZF fund.

One of the most critical concerns is the impact of maritime decarbonisation on food security, particularly in regions that rely heavily on seaborne trade

If the revenue raised is limited to in-sector use such as retrofitting ships, upgrading ports or even producing alternative fuels, then the redistribution of funds is unlikely to match the risk of food security. The evidence makes a strong case that fair implementation of the NZF needs clear and targeted out-of-sector redistribution mechanisms. If funds can be targeted to offset food security vulnerability (e.g. through social protection or agricultural resilience programmes) and to support national development priorities such as renewable electricity infrastructure that could support both households and firms, this could help to offset the potential negative welfare effects.

Opportunities for Africa: Sustainable maritime fuel production and renewable electricity generation

Given the potentially negative impacts of maritime decarbonisation on African economies, it is important to assess what economic opportunities the transition might also present, particularly those that are in line with Africa's ambitions as outlined in the AGII. This section discusses the opportunities for Africa to develop competitive production of 'green fuels', particularly sustainable maritime fuel (SMF), and to leverage maritime decarbonisation initiatives to support the scaling up of renewable electricity and grid development.

An overview of SMF technologies and current production

The EU ETS and the FuelEU Maritime Regulation are driving market demand for cleaner marine fuels, particularly on routes including the EU market. There are a variety of options for low- or zero-carbon fuel technologies vying for dominance. The main contenders are biofuels, methanol (green/blue), ammonia (green/blue) and hydrogen, with liquified natural gas (LNG) mostly considered a transition fuel as it will only ever be able to reduce carbon emissions by 25% compared to oil. The 'grey', 'green', 'blue' distinctions refer to the carbon intensity of production, with grey primarily being from fossil fuels, blue from captured carbon and green from renewable energy. There are also major differences in the energy density of the various fuels and therefore the size of fuel tanks needed (as well as the potential cargo space sacrificed to enable this). In addition, there are currently large differences in technological readiness.

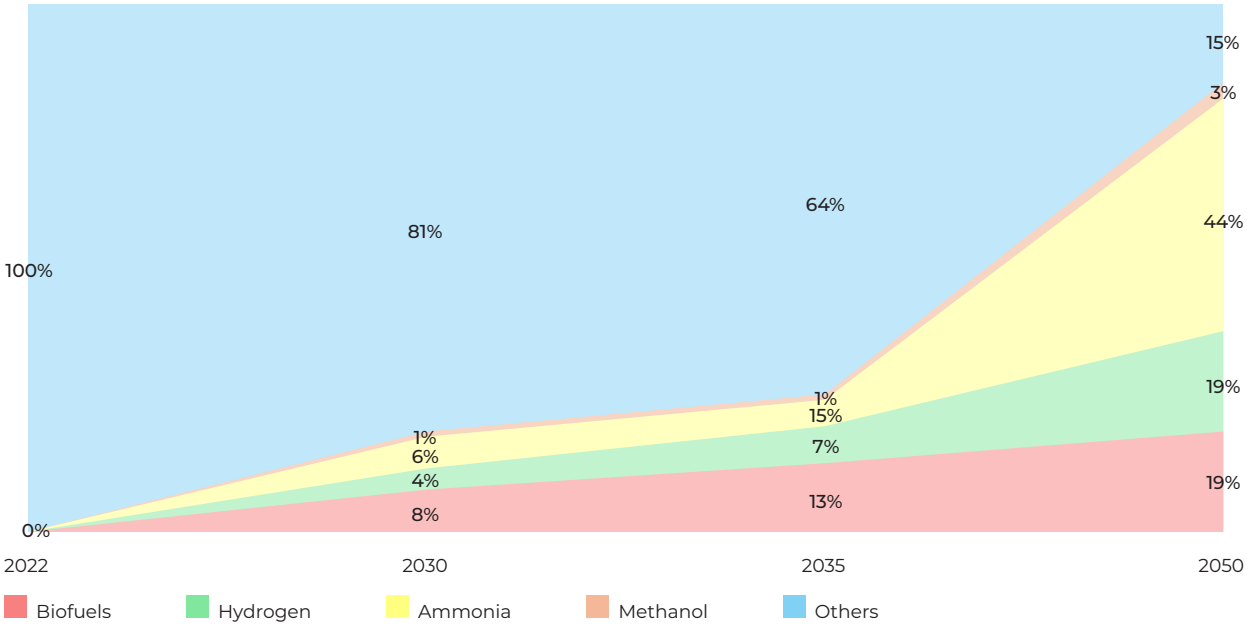
Table 3: SMF technologies – readiness and ease of use

Technology	Maturity	Shipboard ease of use
Methanol	Medium–high: technology exists; many dual-fuel ships are on order	High: liquid at room temperature, easy to pump; has low energy density so requires larger fuel tanks
Ammonia	Low–medium: entering early commercial or demonstration phase	Low: extremely toxic and corrosive; requires specialised safety zones and rigorous training
Hydrogen	Low: used in fuel cells for small vessels; internal combustion is nascent	Very low: extreme cryogenic storage (–253 degrees Celsius) or high-pressure tanks, so requires significantly more space
Biofuels (hydrotreated vegetable oils)	Very high: a 'drop-in' fuel requiring little to no engine modifications	Very high: can be mixed with standard diesel or used pure; no new tanks are needed
Nuclear	Very low (commercial): long history in navies, but civilian use is conceptual	Moderate: once installed, no refuelling for at least 10 years; high regulatory and port-entry hurdles

Source: compiled from various information from the IMO and the Government of the Republic of Korea's Future Fuels and Technology for Low- and Zero- Carbon Shipping Project[22]

Forecasting by the International Energy Agency (IEA) predicts green ammonia to be the leading SMF by 2050, with green methanol at very marginal levels and ongoing roles for hydrogen and biofuels.

Figure 2: Predicted use of different SMFs by 2050



Source: IEA[23]

The current production of SMF is concentrated in developed economies, the Middle East and China.

- **Biofuels** (64.2% of the current SMF market): the US and Brazil together account for 80% of global ethanol production and are in the process of pivoting production towards marine fuels. Indonesia and the EU are the other primary producers of biodiesel used in marine blends.
- **Green ammonia** (3.7% of the current SMF market): production is transitioning from pilot to commercial scale. China, the US and the Middle East are the main focal points, with Chinese projects expected to lead early output.[24] Saudi Arabia's massive NEOM green hydrogen project is designed to provide a dedicated export route for green ammonia from the Red Sea.
- **Green methanol** (30.7% of the current SMF market): Denmark is a pioneer in this area, with the world's first large-scale commercial e-methanol plant Kassø launched in May 2025. China is also scaling rapidly, with Shanghai Electric's Taonan facility and the China International Marine Containers (CIMC) plant.[25]
- **Hydrogen** (1.4% of the current SMF market):[26] China is leading the way. Sinopec's Kuqa Green Hydrogen project is the world's largest operational green hydrogen facility, increasingly used to fuel domestic green shipping corridors along the Yangtze River and coastal routes.[27] The Netherlands and Norway are also developing maritime hydrogen led by the port of Rotterdam and Norway's Green Shipping Programme.

Africa's SMF potential

At present, no African countries are producing sustainable marine fuel at scale. However, some have highly cost-efficient renewable energy potential, which would enable them to produce the green hydrogen that is central to the production of green ammonia and green methanol. A number of African countries have the agricultural base to support biofuel production. South Africa, Egypt, Morocco, Namibia, Mauritania and Djibouti are front-runners, and some significant investments are already taking place. In addition, the position of Egypt and South Africa at key maritime choke points (the Suez Canal and the Cape of Good Hope, respectively) gives them strategic geographic advantage.

Table 4: The SMF potential and current investments of select African countries

Country	Primary fuel focus	Strategic advantage	2025/2026 status update
Egypt	Green ammonia Green methanol	Control of the Suez Canal, which sees 12% of global trade. Abundant solar resources.	Egypt's Suez Canal Economic Zone (SCZONE) confirmed its first large-scale exports of green ammonia in January 2026. Although not for use in shipping yet, the project is very well placed. C2X (Maersk's parent company) and Egyptian partners are developing a significant green methanol facility strategically located in Ain Sokhna.[28]

Country	Primary fuel focus	Strategic advantage	2025/2026 status update
Morocco	Green ammonia	Direct access to the Strait of Gibraltar and the EU market. Significant wind and solar in the south.	While still in the development stage, TotalEnergies' Chbika green hydrogen project aims for 200 000 tonnes of green ammonia annually for export.[29] The OCP Group is investing US$13 billion (2023–2027) as part of its green energy strategy transition, including signing a memorandum of understanding with Maersk.
Namibia	Green ammonia	Vast, uninhabited coastal deserts with consistent wind and sun.	In 2025, Namibia launched a large-scale solar-powered green hydrogen facility in the Walvis Bay port. The facility is designed to produce green ammonia for shipping and a green hydrogen refuelling station, as well as a Hydrogen Academy.[30] In December 2025, the African Development Bank approved a US$10 million loan to support the Hyphen Hydrogen Energy company for a 3 gigawatt (3 GW) green hydrogen and ammonia project.[31]
South Africa	Green ammonia Green hydrogen	Strategic 'Cape Route' location. Established port infrastructure at Saldanha Bay in the Western Cape province, and the Coega Special Economic Zone in the Eastern Cape. Wind and solar potential in the Northern Cape.	A feasibility study has concluded that iron ore could be carried from Saldanha Bay to Europe on green ammonia–powered carriers from 2029, with full decarbonisation by 2035.[32] Hive Energy has plans to develop a US$5.8 billion green hydrogen project in Coega. The project is designed to position the port as a green ammonia bunkering hub.[33] The EU has announced support for this project.
Mauritania	Green ammonia	Massive land availability for renewable energy. Strong wind speeds near the coast for 24/7 production.	CWP Global is developing a US$40 billion green hydrogen AMAN project aimed at producing 10 million tonnes of green ammonia. Danish company GreenGo has also signed a framework agreement with the Mauritanian government to build a 35 GW green hydrogen and ammonia plant, although plans have been scaled back.[34]

Country	Primary fuel focus	Strategic advantage	2025/2026 status update
Djibouti	Green ammonia	Located on the Bab el-Mandeb strait, a high traffic transit point for ships entering the Red Sea.	In July 2022, Australian firm Fortescue Future Industries signed a framework agreement with Djibouti to explore and develop up to 10 GW green hydrogen and ammonia projects in the Grand Bara area.[35]
Kenya	Green ammonia	Over 90% renewable grid (geothermal and wind). Strategic location of the Port of Mombasa.	A Global Maritime Forum report identified Kenya as a top-tier competitive producer for Indian Ocean routes, particularly for e-ammonia and e-methanol.[36]

Source: authors' analysis

Africa SMF development reality check

It is important to note that African countries face considerable challenges in translating their significant potential for sustainable marine fuel production into realised investments. Difficulties include:

- Strong competition from more advanced economies that are strategically located for different markets, have relevant infrastructure and technologies and do not face the same risk perception challenges;
- Lack of clear market signals that would enable offtake agreements;
- Lagging infrastructure including pipelines and specialised shipping docks; and
- Low levels of intellectual property and ownership of technology.

Green ammonia is predicted to be the leading technology for deep-sea, long-haul decarbonisation due to its scalability. Although a number of African countries have strong potential, they face significant competition from:

- Saudi Arabia: the NEOM Green Hydrogen Project is the world's largest, valued at US$8.4 billion. It reached 90% construction completion in 2025 and is on track for full commissioning in 2027, aiming to produce 1.2 million tonnes of green ammonia per year.[37]
- China: the Envision Clean Energy Hub began exporting its first commercial green ammonia cargo to South Korea in early 2026. It currently produces 320 000 tonnes annually, with a target of 1.5 million tonnes by 2028.[38]
- Spain: in March 2026, EUR 1 billion was approved for the Andalusian Green Hydrogen Valley project, which will be Southern Europe's largest green hydrogen plant, dedicated to maritime and aviation fuels.

Technology transfer and skills development gaps

While Africa possesses the resources to develop competitive SMF production, as the preceding sections demonstrate, it remains heavily dependent on foreign investment, partnerships and foreign-owned technologies. The most critical technologies for sustainable fuels – high-efficiency electrolysers, carbon capture membranes and ammonia synthesis catalysts – are patented by companies in developed countries or China.

A study by the international Renewable Energy Agency (IRENA) on enabling green hydrogen development in North Africa noted that one of the main barriers is the high cost of electrolyser technologies. The study adds that these technologies are concentrated in Europe and that North Africa 'could benefit from, technology transfer and even develop innovative domestic ecosystems by manufacturing some of the renewable power technology, as well as electrolysis balance of plant components … rather than having to import them'.[39] A study led by the Technical University of Munich (TUM) found that green hydrogen projects in Africa faced a higher risk premium, and therefore costs, for a number of reasons including the lack of local skills, for example in deploying and maintaining wind turbines.[40]

To combat these issues, a number of African governments are implementing proactive policies to ensure technology transfer and local skills development as part of their green fuels policies:

- In Egypt, in order to qualify for green hydrogen incentives, developers must use locally produced components whenever available, with a minimum requirement of 20% local content. In addition, the government restricts foreign workforces to a maximum of 30% of the total staff on projects, forcing international firms to hire and train Egyptian nationals for technical roles.[41]
- The Namibian government holds a 24% equity stake in the US$10 billion Hyphen Hydrogen Energy project, giving it direct board-level oversight of technology decisions. The project has a legally binding target to spend 30% of its procurement on local Namibian companies for goods, services and materials.[42]
- South Africa's *Green Hydrogen Commercialisation Strategy* prioritises 'localisation support' as one of its six core success pillars. The government is pushing for the local manufacture of fuel cells and electrolysers by leveraging South Africa's status as the world's largest producer of platinum group metals (PGMs) – a critical component in green hydrogen technology.
- The 'Morocco Green Hydrogen Offer' uses a tiered premium system to reward technology transfer. Projects that contribute significantly to the 'ownership of leading-edge technologies', support industrial integration or create high numbers of stable local jobs can receive an investment premium of up to 30% of the total project amount.[43]

Opportunities to leverage maritime decarbonisation to accelerate renewable electricity production

The AGII aims to establish renewable-driven industrial clusters and support the development of green shipping corridors, both of which can use port electrification as a springboard for wider green industrialisation and sustainable trade. EU shore power mandates, included in the FuelEU Maritime Regulation, further incentivise the provision of clean electricity to ports. If effectively leveraged, these electrification mandates, along with the revenues created by the NZF, could provide an opportunity to further renewable supply and grid investment across a number of African countries with international ports. Benefits could include port efficiency, lower energy prices and stability for other sectors of the economy, as well as improved energy access for port-city residents.

Possible priority areas for the use of Net Zero funds for Africa

- Green energy production including both SMF and renewable electricity: leveraging NZF funds to support the development of these value-added industries would support technology upgrading and quality job creation as well as reduce the continent's dependence on costly imported fuels.
- Mitigating trade costs and food security impacts: an effective use of revenues would be to devise a mechanism to offset the increase in freight costs, thereby tempering some of the most problematic effects in food security, as well as to invest in domestic food production and social protection schemes.
- Shipping sector modernisation: Africa has ambitions to upgrade ports to handle the next generation of ships. Without these upgrades, African trade could be stranded as global fleets transition to cleaner technologies. By prioritising infrastructure investments that have wider societal benefits, Net Zero funds could be leveraged for maximum potential.
- Workforce training and technology transfer: the green transition requires a massive shift in technical skills for African seafarers and port engineers as well as substantial changes in the ownership of technology. This skills upgrading is also a central pillar of the AGII.

Conclusion and recommendations

The decisions made in the coming months regarding maritime decarbonisation will shape African economies for decades, impacting everything from the cost of essential imports such as food and fuel, to the global competitiveness of the continent's exports. While these shifts present significant risks for vulnerable economies, they also offer transformative opportunities for nations with renewable energy and strategic maritime locations to lead in green industrial development and sustainable fuel production. To secure these benefits while mitigating the risks, African governments must participate collectively in international negotiations, aligning maritime policies with broader continental initiatives for green industrialisation and energy transition. Strengthening regional coordination, enhancing technical analytical capabilities and forming strategic alliances with other developing economies will be essential to ensure that African interests are respected.

Africa will be disproportionately impacted by maritime decarbonisation.

The evidence synthesised in this policy brief points to a clear conclusion: although global climate measures are being designed to reduce GHG emissions from ships, their economic costs and adjustment burdens are unevenly distributed. African economies are likely to face disproportionately high impacts due to structural vulnerabilities arising from dependence on maritime trade for both food imports and agricultural exports.

Evidence from shipping operators serving African export routes indicate that existing regional decarbonisation policies, including emissions trading and fuel standards, are already increasing logistics costs. Additional maritime decarbonisation measures could further reduce the competitiveness of African exports, particularly for perishable goods that require rapid and reliable transport. Longer transit times, route restructuring or consolidation of shipping services could increase spoilage risks and undermine supply chain reliability.

Increases in freight rates are transmitted well beyond ports and shipping operators, affecting the wider economy through higher consumer prices, increased inflationary pressures on governments, rising input costs for farmers and firms and considerable cost upticks for strategic exports and imports. These transmission channels amplify the developmental consequences of climate-related shipping measures.

Negative impacts are likely to be generalised, particularly affecting vulnerable net food and fuel importing economies, while opportunities are more concentrated among already-industrialising countries.

A majority of African countries are likely to experience modest declines in GDP as a result of decarbonisation measures. These decreases mask more marked declines in the exports and imports of certain key sectors, with important consequences for household welfare, food security and future economic development. While negative effects are widely dispersed, including among land-locked and food importing countries, the opportunities – whether through SMF production development or renewable electricity expansion – are likely to be concentrated in a smaller number of countries that have begun industrialising.

Costly duplication of initiatives must be avoided.

Unilateral measures have been imposing significant costs on African operators, and overlapping initiatives threaten to compound the economic challenges that African nations face. It will be important to prioritise global frameworks, where African countries have a direct voice in design and implementation, over unilaterally imposed measures. However, inclusivity does not imply unconditional support. There will be a range of proposals put forward, some of which impose costs without any mechanism to offset this, and some of which risk regulatory duplication. There will be difficult trade-offs to make and proposals should be evaluated against how they impact vulnerable economies and the extent to which they support Africa's green industrialisation aspirations.

Consideration must be given to the scale, governance and scope of any mechanism established to distribute funds resulting from decarbonisation initiatives.

Given the scale and breadth of the impact of maritime decarbonisation initiatives on African economies and the more concentrated nature of potential benefits, it is vital that the mechanism through which any generated funds will be distributed is well designed and able to support African priorities. Consideration should be given to:

- The level of revenue generation: is it enough, given the number of countries impacted and the variety of needs identified?
- Governance: which countries will control decisions regarding scope and priorities for fund distribution? How are the countries selected, and how can African interests best be represented?
- Allocation: country allocations should be determined by a combination of the economic vulnerability and the depth of impact predicted.
- Scope: funds need to be able to be used to support non-shipping-sector priorities, including mitigating the impact on export sectors and on food and fuel security, for example through social protection or agricultural resilience programmes.

Maritime decarbonisation does present opportunities for Africa to further its green industrialisation ambitions, but realising these opportunities will require strong leadership, supportive industrial policy frameworks and policy space.

African countries have the potential to leverage maritime decarbonisation in support of green energy production, both SMF and electrification, with knock-on benefits for industrial development, technological upgrading and skilled job creation. Initiatives to capitalise on these opportunities are in their infancy and face significant obstacles, not least serious global competition, high risk perceptions and costs of capital, and technology and skills gaps. Overcoming these challenges will require active industrial policy measures, some of which are beginning to be implemented, but could be expanded and accelerated.

Recommendations for African policy-makers

- Urgently conduct country-level risk and opportunity assessments, including identifying priorities for the use of decarbonisation funds.
- Approach IMO negotiations and discussions with the EU and other trading partners that are implementing unilateral measures with a unified position and clear demands, building on the assessment above.
- Avoid the duplication of measures. African support for any global measure could be made contingent on securing binding assurance from trading partners that obligations under unilateral initiatives will cease.
- Consider assessing the various proposals being put forward against a set of common principles:
  - Recognition: there needs to be recognition that maritime decarbonisation measures will have a disproportionately negative effect on African economies. This needs to be considered in the context of the African shipping sector's minimal contribution to global emissions.
  - Revenue: measures must include an effective mechanism to offset this disproportionate impact.
  - Addressing impact: the resources generated must be specifically mandated to support not just the poorest but also the most affected economies, and must be able to target wider areas of impact beyond the shipping sector.
  - Voice: there must be a clear and ongoing role for African countries in the governance of revenue dispersal mechanisms.
- Continue to develop supportive green industrial policy frameworks and advocate for policy space to enable technology transfer and prioritise skills development in order to take advantage of the opportunities created by maritime decarbonisation.

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- Scenario 26: GFS without a flexibility mechanism, with a levy (US$150–300), no feebate
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3

Beyond extraction: Leveraging global critical mineral demand to support African EV battery production

Liz May

Introduction

Global interest is accelerating in minerals that are critical for the green transition. Both the United States and the European Union are focused on securing access to Africa's minerals to (re)build their domestic manufacturing and to reduce their reliance on China. At present, African minerals are predominantly exported in raw form, and the most lucrative processing and manufacturing stages of supply chains happen elsewhere. Focusing on the shifts in electric vehicle (EV) battery technology, this policy brief explores how the continent can leverage growing global demand to break this extractive cycle. It assesses possibilities for the development of competitive continental production of EV batteries as part of a wider green industrialisation strategy.

African minerals are predominantly exported in raw form, and the most lucrative processing and manufacturing stages of supply chains happen elsewhere ... [T]he continent can leverage growing global demand to break this extractive cycle

This research first explores the current debates around the role of critical minerals in Africa's development. The paper then dives into EV batteries, looking at trends in the technology, which minerals are likely to be most in demand, production concentration and changing market demands. Next is an outline of the policy landscape, including case studies of countries that have made progress in developing EV battery production. The final section presents conclusions and offers suggestions for African policy-makers to consider implementing for the continent's green transition.

Reality check: Adding value to critical minerals is not a silver bullet for African development

There are strong arguments in favour of adding value to minerals for those countries that can do so, and this strategy forms a central tenet of the African Union's (AU) African Mining Vision (2009) and Africa's Green Mineral Strategy (2024).[1] In the case of electric vehicle (EV) batteries, refining raw minerals into battery-grade chemicals then into battery components and assembled battery packs significantly increases the value of the product. For example, refined lithium, graphite and cobalt can command prices at least four times higher than those of their raw forms.[2]

Moving towards in-country value addition can also support the structural transformation of economies by creating stable, higher-paying, higher-quality jobs such as chemical engineers, lab technicians and specialised logisticians. Moreover, the infrastructure required for mineral refining such as cheap, consistent, high-capacity electricity generation and advanced transport links can have spillover effects to other domestic industries.

However, there are some important caveats to this picture, and care should be taken to view adding value to critical minerals as one tool within a wider economic development strategy.

Despite popular belief, Africa does not hold 30% of the world's critical minerals. This widely reproduced statistic is strongly challenged by Bright Simons. He argues that although a small number of African countries do hold significant world shares of a few minerals, when looking at the aggregate levels, the continent's actual share of global critical mineral production and proven reserves is likely to be less than 5%. Australia, China, Brazil and Canada are ahead in this regard. According to Simons, this 'pervasive myth' can create a dangerous assumption that the continent can simply 'wait for global demand to knock' rather than actively building competitive industrial strategies.[3]

When discussing critical minerals, it is vital to define: critical for whom? Simons argues that while Africa is dominant in a few minerals needed for some green transition technologies (cobalt, platinum and manganese), of much higher importance are the essential industrial minerals needed for the continent's own structural transformation. These include steel inputs, cement additives, battery precursors and fertiliser minerals.[4]

The minerals that Africa does hold are concentrated in a handful of countries. As Nimrod Zalk notes, the impact of the green transition will be highly uneven for Africa, with some countries set to see a sharp decline in export revenues from fossil fuel extraction, which will not be offset by increased revenues from critical mineral extraction.[5] To balance this will require proactive regional cooperation and industrialisation strategies.

While the drive to add value to minerals makes political sense, economically, it may not always be the most strategic decision. There is a danger that over-reliance on mineral beneficiation may perpetuate commodity dependence, with price volatility remaining an issue even quite far up the value chain. As Amir Lebdioui argues, building economic resilience is particularly vital in an era of rapid technological shifts. Rather than focusing on adding value in the mining sector, it may be more strategic – particularly if a country lacks the quality minerals or capacity for competitive refining – to capture the mineral windfall. Then it can be invested into structural transformation in sectors such as agri-tech or other manufacturing, with the aim of building a more diversified and resilient economy.[6]

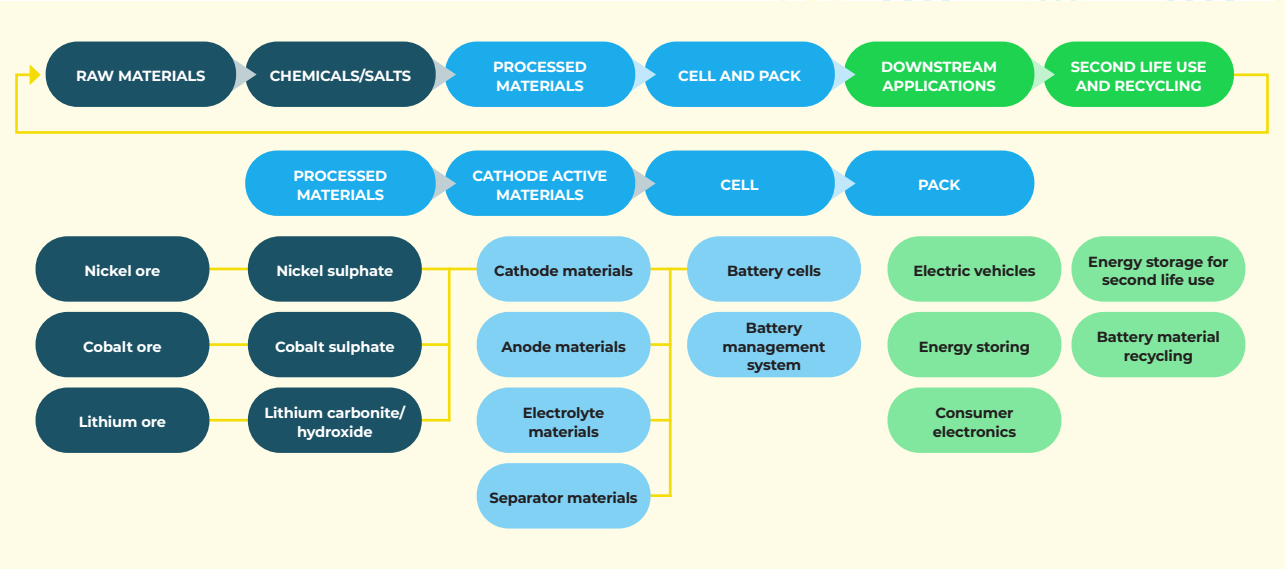
A snapshot of the EV market in Africa

Africa imports 85–90% of the vehicles in use on the continent. South Africa and Morocco are the two largest vehicle exporters in the region, and their assembly operations rely on imported components and largely serve the European Union (EU) and United States (US) markets.[7] Globally, EV demand is growing rapidly, led by China but with strong growth also in Southeast Asia, Brazil, South Korea and India.[8]

EV adoption in Africa is still very low, accounting for less than 1% of total car sales.[9] This is predicted to change speedily with the growing presence of electric two- and three-wheelers, EVs for public transport, small mass-market EVs and demand created by policies such as Ethiopia's ban on the import of internal combustion engine vehicles. The adoption of electric buses and two- and three-wheelers worldwide is outpacing that of passenger vehicles. 43% of new bus sales are electric, 45% new sales of two- and three-wheelers are electric, but only 26% of new passenger vehicle sales are electric.[10]

The production of EVs on the continent is at an early stage of development, but Morocco is poised for rapid growth and there is progress in Ethiopian, Kenya, Nigeria, Rwanda and South Africa. At present, most of the production focuses on assembly using imported parts, including batteries. Given Africa's mineral endowments, there is potential for countries to move into all segments of the battery production supply chain including upstream activities such as battery precursors, battery cells and battery pack assembly (see Figure 1). However, there is incredibly strong competition in all stages of the EV battery supply chain and realisation of this potential will require significant investment in energy production, skills and industrial capacity, as well as focused policy decisions at both national and regional levels.

Figure 1: EV battery value chain



Source: Spasovska et al (2026)[11]

How EV battery technology is changing

There are three main clusters of EV battery technology. These are evolving very rapidly and will serve different markets. Importantly, as the technology develops, there will be shifts in the mix of minerals used, with manufacturers keen to move away from relatively expensive minerals such as cobalt and nickel where supply is highly concentrated.

Lithium-ion batteries

These batteries currently dominate EV battery technology. They are composed of anodes (negative electrodes) and cathodes (positive electrodes), which store and transfer lithium ions through an electrolyte. Most EVs on the road today use one of two dominant cathode chemistries:

- Nickel, manganese, cobalt (NMC): this is a high-performance battery with high energy density allowing longer range and high-performance acceleration. It is currently the main technology used in premium EVs. Manufacturers are moving towards increasing the proportion of nickel in these batteries to reduce dependence on cobalt.
- Lithium iron phosphate (LFP): this is a cheaper but heavier and less energy-dense battery. It now powers roughly 40–50% of the global EV market, with strong growth predicted. LFP is particularly suited to smaller, low-cost vehicles and two- and three-wheelers.

Emerging alternative chemistries

- Sodium ion: in these batteries, it is sodium ions that shuttle between the cathode and anode. This means they will be considerably lower cost as they use widely available sodium instead of lithium. They have lower energy density than LFP batteries but are ideal for small city cars and stationary grid storage.
- Lithium manganese iron phosphate (LMFP): this is an evolution of the LFP battery, using manganese to boost energy density instead of more-expensive nickel.

Next generation solid-state batteries

These batteries replace the flammable liquid electrolyte found in traditional batteries with a solid material – ceramic, glass or polymer. They offer nearly double the energy density of current batteries, meaning they have extremely fast charging times and are virtually non-flammable.

Predictions for different EV battery technologies

According to the International Energy Agency (IEA), battery demand is seeing a swift uptick and is set to become more geographically diverse. Emerging markets and developing economies other than China are expected to double their share of demand from nearly 5% in 2024 to 10% in 2030.[12]

In the overall growth picture, there is likely to be a more fragmented market with different battery types serving different niche markets. This presents an opportunity for African countries, but it is important to understand which chemistries – and therefore which minerals – are likely to become dominant in the future. While this is very hard to determine as the technology is continually evolving, current predictions are that:

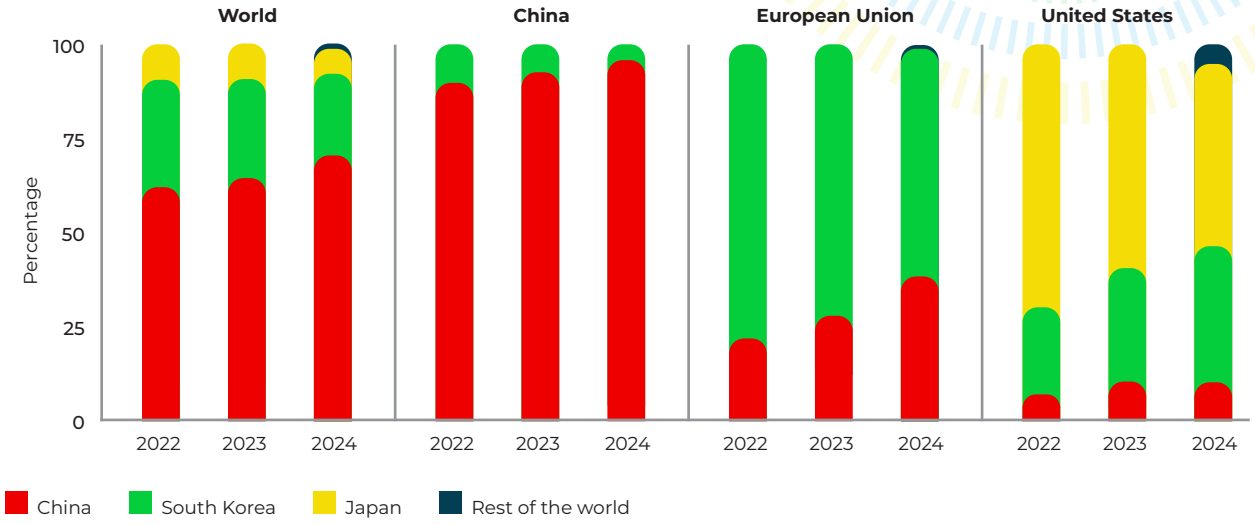
- **LFP and sodium-ion** batteries will be the dominant technologies for mass-market vehicles, with strong competition between the two. LFPs will likely dominate Southeast Asia, Brazil and India, led by the Chinese and Indian EV manufacturers BYD and Tata Motors.[13] The cost of LFP batteries has plummeted (from US$568 per kilowatt-hour (kWh) in 2013 to US$74 kWh in 2025) compared to US$59 kWh for sodium; although their use in EVs is in much earlier stages.
- **LMFP** will dominate the mid-range volume market.
- **Solid-state and high-nickel NMC batteries** will come to dominate high-performance and luxury markets, as the US continues to choose alternatives to the China-dominated LFP batteries.[14]

Global EV battery production and China's dominance

Figure 2 clearly demonstrates that China, South Korea and Japan currently dominate in EV battery production, with marked differences in the markets they serve. China leads in the domestic and world markets while South Korea is the favoured supplier to the EU market and Japan to the US. Looking at the midstream of the supply chain, China's dominance is pronounced (see Figure 3). The country holds an 80–90% share in the global production of EV battery precursor materials. This represents a supply chain security risk and an opportunity for African countries to step in as manufacturers look for alternative sources of input supply.

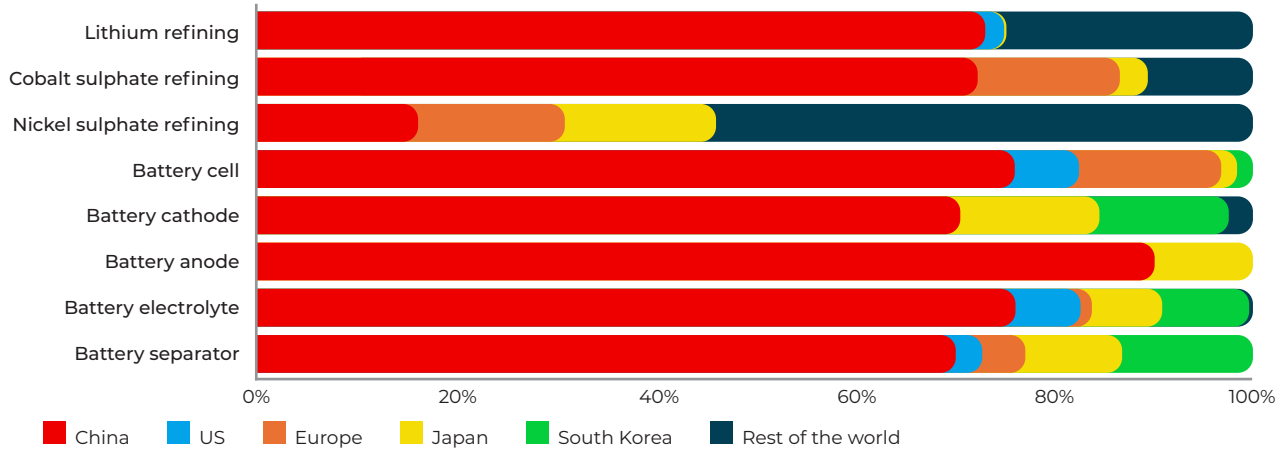
There is a tension here. Customers in the US and EU are keen to reduce their dependence on China and would prefer to buy vehicles and batteries produced elsewhere. However, with the exception of some of the minerals, the technology to produce EV battery inputs is largely held by China and the majority of current investment in Africa is coming from China. Balancing this interface will be a difficult challenge for African countries and it remains to be seen whether the US and EU will be happy with this 'arms-length' relationship.

Figure 2: Share of electric car battery sales by battery manufacturer's headquarters (2022–2024)



Source: IEA (2025)[15]

Figure 3: China's control of midstream EV battery production



Source: BloombergNEF[16]

Digging further into major battery manufacturers by technology, we see unsurprisingly that South Korea and Japan dominate NMC technology, which primarily serves the premium and high-performance markets. Meanwhile, Chinese companies dominate the LFP, sodium-ion and LMFP technologies, which are preferred for mass-market and smaller vehicles.

Table 1: Different EV battery technologies' global market share, application, markets and producers

Technology	Share of global EV market	Use	Market	Producers
NMC	Around 40% of the global market and declining. Likely to retreat to premium market.	Premium and high-performance EVs, markets with cold climates.	North American, European and Japanese vehicle manufacturers (e.g. BMW, Audi, Tesla)	LG Energy Solution (South Korea) SK On (South Korea) Samsung SDI (South Korea) Panasonic (Japan)
LFP	Over 50% and increasing.	Entry and mid-range EVs, vans, stationary energy storage systems (battery swap stations)	BYD, Tesla, BMW, VW	CATL (China) BYD (China) Gotion High-Tech (China)
Sodium-ion	2% and increasing. Just entering mass production. Growing faster in Africa than any other technology for two- and three-wheelers.	Micro-mobility, scooters and e-bikes, ultra-budget small cars, grid storage.	Changan JMEV (Renault group) JAC Motors Chery Huaihai BYD Spiro	CATL (China) began mass production of its Naxtra batteries in 2026.[17] HiNa Battery Technology Co. (China) BYD (China)
LMFP	Around 4% and increasing. Fastest-growing share.	Mid market. Provides range without high price of NMC.	Chery Tesla VW BMW Geely	CATL (China) Gotion (China) SVOLT (China)
Solid state	Less than 0.5% at present.	Luxury and long-haul EVs drones, aerospace.	Chery and Stellantis announced demonstration fleets in 2026.	WeLion (China) ProLogium (Taiwan) Toyota (Japan) QuatumScape (US)

Sources: author; IEA (2026); BloombergNEF[18]

Prospects for African EV battery production

The dominance of China at all stages of the EV battery supply chain is a significant challenge for African ambitions to develop production. This section explores the prospects for Africa to overcome this and make inroads into production at different stages of the supply chain. It focuses on which minerals are needed for the different emerging battery technologies, assesses whether Africa has advantages in any of these areas, and highlights the countries and supply chain segments with the most potential.

As the EV battery market becomes more fragmented, there is a greater range of technologies focused on serving niche markets. Industry forecasts predict that the main battery types in the future will be LFP, sodium-ion, NMC (high nickel), LMFP and solid state. Table 2 shows the most important minerals in the production of these batteries, and the share of reserves and production for relevant African countries.

Table 2: African countries' share of the minerals needed for different EV battery technologies (2026)

Mineral	Battery technology	Country	Share of global reserves (%)	Share of global production (%)	Global rank by production
Lithium	LFP, LMFP, NMC	Zimbabwe	1.4	9.7	4th
Manganese	Sodium-ion, LMFP, NMC	South Africa	30.6	38.0	1st
		Gabon	3.4	25.0	2nd
		Ghana	0.7	10.0	3rd
Phosphate	LFP, LMFP	Morocco	68.0	14.4	2nd
Sodium (soda ash)	Sodium-ion	Ethiopia	1.6	0.09	5th
		Botswana	0.06	1.5	3rd
		Kenya	0.03	1.4	4th
Graphite	All (anode)	Mozambique	8.1	3.3	5th
		Madagascar	8.7	4.4	2nd
		Tanzania	5.8	4.2	2nd
Bauxite	Sodium-ion (foil)	Guinea	25.5	34.1	1st
Iron ore	LMFP, LFP	South Africa	0.8	2.6	7th
		Mauritania	5.1	0.6	16th
Nickel	NMC	South Africa		1.8	
		Madagascar		1.4	
Cobalt	NMC	DRC	50.0	74.2	1st
		Madagascar	0.8	1.3	4th

Sources: U.S. Geological Survey (2026)[19]; IEA Global EV Outlook 2026 and BloombergNEF Electric Vehicle Outlook 2025

Potential winners and losers in Africa

It is clear from Table 2 that a number of African countries hold important positions in EV battery minerals, but there are also risks. Gabon, Ghana and South Africa will likely see continued demand for manganese, Morocco for phosphates and Guinea for bauxite. There is also potential to further develop Zimbabwe's lithium and South Africa and Madagascar's nickel reserves, although they face strong competition from Indonesia, Australia and Chile.

Despite the Democratic Republic of the Congo's (DRC) strong position, cobalt is likely to face shrinking demand as NMC moves towards high-nickel versions. The rapid replacement of graphite with silicon in NMC batteries and the use of hard carbon instead of graphite in sodium-ion batteries will impact Madagascar, Mozambique and Tanzania. This underscores the need for countries to keep a close watch on technological and market developments as well as focus on diversifying their economies. Otherwise, they risk having invested in developing an industry around a mineral that EV batteries no longer require.

Focus on capacity to deliver components for segmented markets

Countries with the required minerals need to leverage their position to push for investors to develop local mineral beneficiation and processing of precursors. With the support of regional industrial policy, they can move towards the production of cell components and battery pack assembly. Investment could be underpinned by the EU and the US's desire to develop alternative production sources in midstream EV battery supply chain. This is also true for the needs of China, which, nearing domestic market capacity, is keen to invest in production (both battery and EV) closer to potential target markets.

The manufacture of battery precursors, components and battery pack assembly in Africa could be designed to serve the domestic market, primarily using sodium-ion and LFP batteries for two- and three-wheelers, commercial vehicles and small mass-market cars using battery swapping. Manufacturing could target other Global South manufacturers as well, although competition here will be much tougher.

There is also potential for African countries to develop more niche battery production focusing on LMFP and NMC batteries to supply continental EV assembly aimed at the European, US and Middle Eastern luxury export markets. While LFP and sodium-ion operations will require partnerships with Chinese firms, LMFP and NMC batteries could also be developed in partnership with South Korean or Japanese firms.

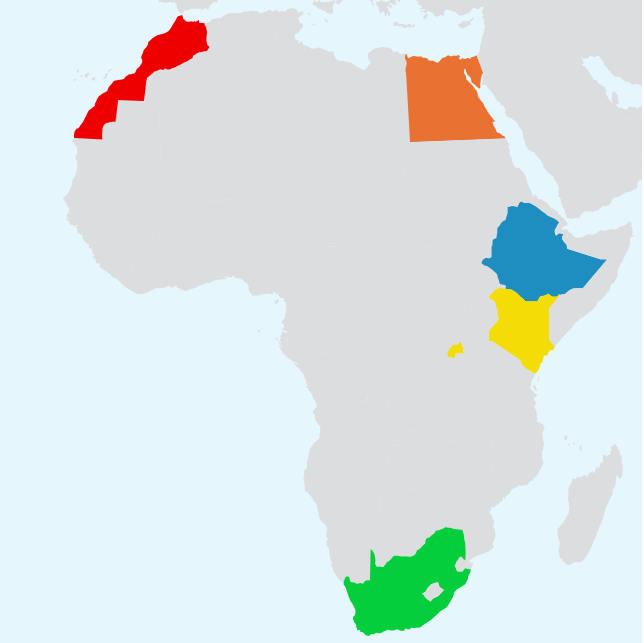
Some of the obstacles to EV battery production in Africa

- The midstream supply chain is dominated by Chinese producers.
- Africa's domestic market is small (but rapidly growing). Domestic mandates for EVs are in their early stages, with Ethiopia, Kenya and Rwanda leading the way.
- The processing of minerals into battery precursors is energy intensive and requires reliable supplies of (green) energy. Access to power has been one of the main bottlenecks in progressing a planned DRC–Zambia battery special economic zone (SEZ).
- Production processes require specialised equipment such as testing facilities and machinery. Much of the technology is held outside the continent.
- To become cost competitive, African production will require solid logistics and transport infrastructure, which is currently lacking.

EV battery projects underway in Africa

There are already some promising investments in Africa at different points in the EV battery supply chain – from precursor material production in South Africa and Zimbabwe to battery pack assembly in Egypt, Ethiopia, Kenya and Rwanda, to full battery production in Morocco. However, some of these projects are at the 'announcement' rather than the 'breaking ground' phase.

Figure 4: EV battery production, battery pack assembly and precursor investments in Africa



- Morocco has the only current EV battery production on the continent with the Gotion High-Tech's gigafactory producing LFP and LMFP.
- South Africa is investing in production of High-Purity Manganese Sulphate (HPMSM) which is used in NMC ad LMFP cathodes.
- Egypt is assembling LFP battery packs, focusing on the electric bus segment, working with Chinese manufacturers Gotion and BYD.
- Ethiopia has banned import of petrol cars and is assembling battery packs (from imported cells) for its growing vehicle centres.
- In Kenya and Rwanda Ampersand and Spiro operate large-scale battery assembly and swap stations focusing on LFP and Sodium-Ion packs for motorbike taxis.

Source: author's compilation

The recipe to Morocco's EV battery success

Morocco has successfully positioned itself as a critical node in the global EV value chain by integrating its natural resource wealth with strategic green industrial policy. The Industrial Acceleration Plan (2014–2020) designated automotives as one of the country's seven sectoral priorities. It focused on encouraging domestic firms to integrate into industrial ecosystems, and consolidating international partnerships with manufacturers, equipment suppliers and sub-contractors. It also offered tax and financial incentives for investments and training programmes, and established dedicated integrated industrial platforms.

The country now boasts a gigafactory producing EV batteries, two factories at Mohammed VI Tanger Tech City producing cathodes and anodes, and another battery component ecosystem producing NMC precursors.

The key ingredients to this success include:

- **Strategic leveraging of phosphate:** Morocco holds approximately 70% of the world's known phosphate reserves, which have become strategic due to the global shift to LFP battery chemistry.
- **Strategic investment in green production:** the country's state-owned OCP Group's Green Investment Plan is targeting a transition to 100% renewable energy by 2027. This 'green phosphate' is a key requirement of the EU's Batteries Regulation.
- **Strategic use of trade agreements:** although this predates the EV era (and the benefits of the US agreement have recently been eroded), Morocco has been able to develop its vehicle manufacturing industry due to the EU–Morocco association agreement and a free trade agreement (FTA) with the US, which gives the country duty-free access to these markets.
- **Strategic leveraging of Chinese investment:** Morocco has succeeded at becoming a neutral manufacturing partner, able to sell to the US and EU markets while also negotiating tactically with Chinese battery giants.
- **Strategic renewable energy infrastructure:** in addition to green phosphate, Morocco's investment in renewable energy has helped secure investments from manufacturers that value this, as well as providing low-cost industrial electricity. To enable the full EV supply chain to be green, Morocco's Tanger Med port complex is supplied by 100% renewable energy and has implemented onshore power supply, enabling vessels to plug into the green grid.

Policy environment: The new scramble and Africa's response

The geopolitical arena around access to Africa's critical minerals is currently characterised by the US and EU's use of a wide range of policy instruments aimed at securing stable and diversified sources of supply for domestic manufacturing, while lessening their reliance on China. These instruments include trade agreements, partnerships, memoranda of understanding (MoUs), investments in strategic infrastructure and rail corridors. Most of these initiatives make reference to the importance of African value addition. However, it is not always clear how this is supported in concrete terms, and there are challenges around Africa's ability to ensure a coordinated and strategic response as the deals are mostly bilateral.

Chinese companies continue to invest in both mining and, increasingly, downstream activities on the continent. The Chinese government's zero-tariff offer for 53 African nations came into effect in May 2026 but may do little to shift the high levels of concentration that China has over the midstream supply chains.

The US approach

The US has initiated a number of sector-specific deals, MoUs and investments with individual African countries, proliferating in 2025, as part of a broader industrial policy push aimed at securing African minerals to supply US manufacturing. In parallel, the US is taking active steps to limit imports from China, including 100% cost-plus tariffs on imports of Chinese EVs and a 25% tariff on Chinese EV batteries (at the time of writing). This patchwork of initiatives has overtaken the African Growth and Opportunity Act, the US's traditional trade preference approach to Africa.

These initiatives operate outside the traditional FTA and World Trade Organization frameworks and are characterised by high degrees of asymmetry and a clear 'American-first' approach. Elements such as exclusive take-off rights designed to prevent sales to China in the US–DRC agreement actively limit the space for countries to develop diversified markets for products required for a resilient economic policy. Furthermore, these elements create very little support for value addition.[20]

The EU approach

The EU is billing its approach as more clearly focused on value chain development and supporting African industrialisation, backed by the Global Gateway fund, which deploys financing in Africa. This approach is exemplified in the recent Clean Trade and Investment Partnership (CTIP) signed with South Africa. This is a slimmed-down trade deal, focused on supporting sectors such as green hydrogen as well as scaling up clean energy and developing local clean value addition.[21]

However, there is tension in the EU's approach between the competing objectives of reducing dependence on China, supporting domestic EU manufacturing and a desire to support international development. This can be seen in the EU's flagship Critical Raw Materials Act (2024), which includes two key targets. The first is that no more than 65% of any strategic mineral should come from a single third country – theoretically encouraging African sourcing. The second is that 40% of strategic raw materials should be processed within the EU.

The South African CTIP is built around a EUR 4.7 billion Global Gateway package. However, this instrument relies heavily on the use of loans and de-risking instruments for 90–95% of the total, with only EUR 303 million in EU grants.

Table 3: Summary of US and EU bilateral critical minerals agreements with African countries

Instrument	Year	Key characteristics
DRC–US strategic partnership agreement on the development of critical mineral supply chains	2025	Is the most extensive and formal agreement, creating signification obligations on the DRC with no explicit financial commitment. Establishes a strategic asset reserve with exclusive rights for the US, and provides preferential incentives (fiscal, tax regulatory) for US investors. Exports to be routed via the Lobito Corridor, which the US has heavily backed.
DRC–Zambia–US EV MoU	2022	Has the stated aim to facilitate the 'development of an integrated value chain for the production of EV batteries in DRC and Zambia ranging from raw material extraction to processing, manufacturing, and assembly'.[22] No binding commitments from the US. Limited to facilitating feasibility studies and technical assessments raising awareness of investment opportunities.
Morocco–US MoU, and Guinea–US MoU	2026	Signed at the US-hosted 2026 Critical Minerals Ministerial. Text of neither MoU has been released. Reports suggest that they intend to strengthen supply chains for minerals deemed essential for the US energy transition, defence technology and manufacturing. The Guinea deal covers cooperation in exploration, local processing, traceability, supply chain security, investment facilitation and environmental standards in the extractive sector.[23]
US–Rwanda minerals cooperation framework	2025	Signed in parallel with the DRC agreement as part of a wider peace accord. It aims to expand cooperation to develop Rwanda's processing capacity of tantalum, tin and tungsten as well as refined concentrates.[24]
South Africa–EU CITP	2025	Based on EUR 4.7 billion in Global Gateway investments focusing on energy transition, particularly green hydrogen. Financing is primarily in the form of loans and de-risking instruments.
Namibia–EU strategic partnership on raw materials	2022	Focuses on cooperation, the mobilisation of funding for infrastructure and some support for capacity-building, training and skills development. It is not binding and the financing is mostly in the form of large loans, with only EUR 63 million in direct grants.
Rwanda–EU strategic partnership on critical raw materials	2025	Encourages support for Rwanda as a processing and traceability hub for a range of East African minerals. Focused on cooperation rather than binding commitments, and has been criticised as a way of rebranding minerals from conflict areas in the DRC.
DRC–EU strategic partnership on sustainable raw materials value chains	2023	Aims to mobilise up to EUR 300 billion in investments. Roadmap to set out main activities. Non-binding but strongly linked to funding for the Lobito Corridor.

Africa's policy approach and response

A central African aspiration in this discussion, articulated in the Africa Mining Vision, Africa's Green Minerals Strategy (AGMS) and the Africa Green Industrialisation Initiative, is to use the presence of minerals as a springboard for green industrialisation. The AGMS, in particular, prioritises the development of battery supply chains and the production of two-, three- and four-wheeler EVs.[25]

A number of policies to deliver this goal are being undertaken at the continental, regional and national levels:

- The African Continental Free Trade Area (AfCFTA) can support the development of regional green supply chains, through lowering costs and barriers to trade between countries.
- Regional initiatives aim to produce battery precursors. A notable example is the planned DRC–Zambia SEZ leveraging the DRC's cobalt and Zambia's copper.
- A number of countries are using export controls (taxes or bans) to encourage domestic value addition. For example, Malawi, Namibia and Zimbabwe have banned the export of unprocessed minerals.
- Morocco and South Africa have introduced local content incentives as part of their wider green industrialisation policies, which provide tax breaks for companies that source a certain percentage of battery components locally.
- The African Export–Import Bank is funding the feasibility study for the DRC–Zambia battery SEZ. Funding is also available from the AfCFTA Adjustment Fund. (A study by BloombergNEF confirmed that building a precursor plant in the DRC would cost three times less than a similar facility in the US.)[26]

Policies to boost EV battery production: The case of Indonesia

Indonesia is home to the world's largest nickel reserves but had been largely exporting raw nickel ore. From 2019, the country began implementing a range of active policy measures designed to encourage the local processing of nickel and to develop EV battery production and manufacturing. The main policy tool has been a ban on the export of raw nickel ore, introduced in 2020. In the five years since the ban, dozens of smelters and processing facilities have been built, largely by Chinese investment, producing nickel pig iron (for stainless steel) and mixed hydroxide precipitate for use in EV batteries. Exports of processed nickel products have grown from US$5.8 billion in 2020 to US$22 billion in 2023.[27]

Attempts to integrate this with EV battery production have faced regional demand challenges. Seventy-five per cent of EVs in Southeast Asia use LFP batteries, which do not require nickel; however, a battery factory has been established in partnership with Hyundai, focusing more on high-performance domestic and premium export markets.

Export restrictions have been complemented by policies aimed at creating demand for locally produced EVs and incentives for firms to invest in local production. These include reducing value added tax on EVs made with 40% local content, and exempting EVs from car ownership tax in Jakarta. A particularly successful policy has been a temporary removal of duties on imported EVs (previously 50%) for companies committed to establishing a factory in the country by 2026. Companies are required to provide a bank guarantee for the same amount they would have paid in duties and taxes. This has led to increased investments from car manufacturers for EV assembly and production including Chery, PT Sokonindo, VinFast, BYD and Toyota.[28]

As a number of countries are proceeding with negotiating or agreeing to bilateral MoUs or sectoral agreements, there is an urgent need for greater coordination at the regional and continental levels. This kind of engagement will ensure that Africa is able to leverage global demand and desire to reduce dependence on China and progress towards tangible outcomes in investments, technology transfer, jobs and skills development on the continent. Some have suggested an 'African green minerals forum' or alliance that would enable a more united front and prevent a race to the bottom. This could be underpinned by a fund or financing mechanisms that can invest in exploration, technological predictions and skills development.

Conclusion and recommendations

As countries are vying for access to Africa's minerals to secure supply chains and relieve the general overreliance on China, and as China itself seeks new market gains, there are opportunities for African countries to leverage this interest to develop value-added industries across a range of battery technologies with different markets applications. Preventing this from becoming a second 'Scramble for Africa' will require proactive continental, regional and national policies aimed at ensuring local value addition, job creation, skills development and technology transfer.

To make the most of this opportunity, African countries will need to negotiate strategically with investors, which will require sound research and information about mineral deposits (quality and quantity) and the latest market trends and developments in EV battery technology. Chinese dominance of the midstream stages of the EV battery supply chain is a significant challenge. To tackle it, African countries need to move beyond a mindset of 'having the right minerals' to building the case for investment on the basis of sound infrastructure and a cost-competitive offer, including affordable and reliable renewable energy, a skilled workforce and a supportive policy framework.

Suggestions for African policy-makers to consider:

- **Industrial policy:** develop an active industrial policy – ideally at the regional level. The successes in both Morocco and Indonesia (as well as South Korea before them) relied on the provision of strong incentives. This can include export bans or taxes, local content requirements for investors, strong research and development, market-building policies to encourage domestic EV battery demand and investment in the required clean energy, transport and skills infrastructure.
- **Research:** there is a danger that countries could pin their hopes on minerals that are likely to be made redundant by technological developments. Individual countries and regions need to invest in technology foresight planning as well as geological research to make sure they know what will be needed, what they have and at what grade. Knowledge is bargaining power.
- **Market focus:** a growing market divide in EV battery technologies is probable, with different market niches favouring different battery types. Countries need to be clear about the precise market segment(s) they are serving.
- **Partnerships and economic diplomacy**: Chinese market dominance cannot be avoided in the EV battery space. African countries need to be able to walk a fine line between working in close and smart partnerships with companies that hold the skills and technologies to develop value-added production, and simultaneously being a neutral provider of products to the countries keen on lessening their dependence on China.

- **Regional approach:** wherever possible, it will help for African countries to work together rather than to compete. No single country has all the minerals required for EV batteries, so the development of regional supply chains, underpinned by regional industrial policies, will be key. At the continental level, Africa has strong plans but these need to be translated into institutions, financing mechanisms and policies that will deliver.
- **Resilient development and economic diversification:** there is a significant danger of swapping one form of commodity dependence for another – slightly more lucrative – form of dependence. Resilient development and economic diversification will need to be at the forefront of African policy-makers' minds.

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4

Sustainability at MC14: Outcomes and implications for Africa

Colette van der Ven and Sanvid Tuljapurkar

Introduction

In March 2026, the 14th Ministerial Conference (MC14) of the World Trade Organization (WTO) took place in Yaoundé, Cameroon. Hosting the conference on African soil for only the second time in the WTO's history carried significance for the continent. However, against a backdrop of deepening geopolitical instability, the questioning of foundational WTO principles such as the non-discriminatory most-favoured-nation trading rule[1] and an increasing turn away from multilateralism, expectations for MC14 were low from the outset. Indeed, MC14 failed to deliver on the key issues on its agenda and closed without a ministerial declaration that would guide the WTO's work going forward.

The sustainability agenda fared no better, with no renewed statement on the urgency of addressing environmental challenges such as climate change, biodiversity loss and pollution.[2] This repeated the pattern of the 13th Ministerial Conference, which failed to deliver concrete outcomes or build on the sustainability momentum created during the 12th Ministerial Conference. The most consequential sustainability developments did not emerge from the multilateral negotiating process but from a set of member-driven plurilateral initiatives: the Trade and Environmental Sustainability Structured Discussions (TESSD), the Dialogue on Plastics Pollution and Environmentally Sustainable Plastics Trade (DPP), and the Fossil Fuel Subsidy Reform (FFSR) dialogue. A number of other sustainability-related initiatives emerged on the sidelines of MC14.

The nature of the outcomes of these initiatives, in the form of technical documents, best-practice frameworks, and non-binding commitments instead of binding agreements, also signals an evolution in the functioning of the WTO, especially on the sustainability agenda. It is possible that these outcomes will increasingly shape global sustainability-related trade policies, including for the African continent. However, for these initiatives to advance sustainable trade in Africa would require a step-change from discussions to concrete policy actions.

This policy brief first provides an overview of key MC14 outcomes, followed by sustainability outcomes. The brief analyses Africa's broader engagement on sustainability-related trade issues at MC14, and assesses the implications for Africa of the outcomes of each member-driven sustainability-related trade initiative.

An overview of MC14 outcomes: Small wins and missed opportunities

The 14th Ministerial Conference (MC14) of the World Trade Organization (WTO) ended with a small number of outcomes and closed without a ministerial declaration. As the conference chair, Cameroon's minister of trade, acknowledged: 'We ran out of time.'[3] This section provides an overview of the discussions around key headline issues including WTO reform, the Investment Facilitation for Development (IFD) Agreement, the e-commerce moratorium, the least-developed countries (LDC) package, and fisheries.

Discussions on WTO reform, framed as the centrepiece of the MC14 agenda, focused on three thematic areas: decision-making; development, including special and differential treatment; and levelling the playing field.[4] The level-playing-field issue refers to negotiations on regulating interventionist economic policies such as industrial subsidies, and trade measures tied to climate and environmental objectives. Progress was difficult, reflecting members' vastly different approaches to the issue. The European Union (EU) and the United States (US) are focused on distortions created by state-owned enterprises, subsidies and non-market practices. Meanwhile, the African Group,[5] which consists of 45 African member states, focuses on addressing entrenched imbalances in rules and outcomes, including in agriculture, subsidies, technology transfer and market access.[6] A draft ministerial declaration on WTO reform and work plan was circulated but not adopted, with discussions marked for continuation. However, no substantial progress was made on this issue at the first General Council meeting held after MC14 in May 2026.

Members also failed to reach consensus on incorporating the IFD Agreement – which aims to facilitate foreign direct investment flows among its parties – into the WTO framework as an Annex 4 plurilateral agreement.[7] Integration into Annex 4 would have given the agreement formal status within the WTO system, even if it would bind only those members who accept it. Parties to the IFD are now exploring ways to implement the IFD Agreement outside the WTO system.[8]

Similarly, members disagreed on extending the WTO moratorium on customs duties on electronic transmissions, reflecting concerns expressed by certain developing countries regarding revenue collection and policy space. While no African country opposed the proposed extension of the e-commerce moratorium, the African Group requested an assessment of its impact on African economies.[9]

Other issues that failed to reach consensus include the moratorium on non-violation and situation complaints in the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). This agreement entails complaints that may be brought against a member even when the member is acting legally under WTO rules but nullifies or impairs the expected trade benefits of another member.[10] Members also failed to reach an agreement on the LDC package**,** which included extended special treatment under WTO agreements after LDCs graduate to 'developing country' status.[11] This issue is particularly important for Africa, given that

it is home to 27 of the 37 LDCs that are WTO members.[12] Members continue discussions on these issues at the General Council.[13]

The small wins from MC14 include members' commitment to completing the unfinished elements of the Agreement on Fisheries Subsidies (AFS),[14] most notably overcapacity and overfishing under Article 12, with ministers agreeing to continue negotiations.[15] [16] These negotiations are directly relevant to many African countries, given that curtailing subsidies that support overcapacity and overfishing could reduce the ability of foreign fleets to exploit Africa's fishery resources.[17]

Members also adopted two decisions endorsed earlier in Geneva. The first is the ministerial decision on the Work Programme on Small Economies,[18] which instructs the WTO Secretariat to provide specific information on improving trade logistics, border processes and digital tools to boost transparency, while helping small economies and micro-, small and medium enterprises (MSMEs) to participate more effectively in global digital trade, among other purposes.[19] This decision will be important for integrating small African economies such as Cabo Verde and Mauritius, and their MSMEs, into global digital trade.[20] The second ministerial decision that was adopted is on enhancing the implementation of the special and differential treatment provisions of the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS)[21] and the Agreement on Technical Barriers to Trade (TBT).[22] [23] This decision authorises the SPS and TBT committees to continue discussions on improving the implementation of the two agreements' provisions, including those related to special and differential treatment.

MC14's key sustainability-related trade outcomes

Reflecting on a world that is increasingly moving away from sustainability priorities, and as highlighted in the previous section, MC14 produced no formal sustainability outcomes, with no substantial progress on AFS negotiations and very limited progress on level-playing-field discussions. However, sustainability was not entirely absent from MC14 deliberations, with more than two-thirds of official ministerial statements referring to the sustainability dimensions of trade.[24]

Moreover, some progress was made in member-driven sustainability-related trade initiatives outside the formal WTO committees. This was mostly in the form of structured discussions and dialogues such as the Trade and Environmental Sustainability Structured Discussions (TESSD), the Dialogue on Plastics Pollution and Environmentally Sustainable Plastics Trade (DPP) and the Fossil Fuel Subsidy Reform (FFSR). These initiatives are designed to offer members a space to have open and frank discussions on specific sustainability-related trade issues without the pressure of formal negotiations. The progress made on these initiatives is reflected in their communications, ministerial statements and outcome documents, as summarised in Table 1.

Table 1: Overview of key sustainability-related WTO initiatives and their MC14 outcomes

Initiative	WTO members	African members	Overview and purpose	Progress at MC14
Multilateral outcomes				
Agreement on Fisheries Subsidies (AFS)	Ratified by 119 WTO members	31	Prohibit harmful fisheries subsidies, including illegal, unreported and unregulated fishing.	Committed to continuing negotiations on overcapacity and overfishing under Article 12 of the AFS.
WTO reform: level-playing-field track	Discussed by all WTO members	n/a	Determine how to respond to increasingly interventionist economic policies, industrial subsidies and trade measures tied to climate and environmental objectives.	Ministerial declaration on WTO reform and work plan not adopted.
Plurilateral member-driven sustainability-related trade initiatives				
Trade and Environmental Sustainability Structured Discussions (TESSD)	79	Cabo Verde, Chad, The Gambia, Senegal[25]	Launched in 2020 to advance discussions on trade and environmental sustainability; complement the work of the Committee on Trade and Environment and other relevant WTO bodies; support the objectives of the Marrakesh Agreement Establishing the WTO. Thematic areas of work: trade-related climate measures; environmental goods and services (EGS); circular economy; subsidies.	• Developed summary documents on the insights and outcomes of five years of TESSD's work. • Produced outcome documents reflecting progress in each thematic area: compilation and mapping of trade-related climate measures; indicative EGS list with trade barriers and development perspectives; circular economy best practices (textiles, batteries, renewable energy, electronics); elements for designing low-carbon economy subsidies.

Initiative	WTO members	African members	Overview and purpose	Progress at MC14
Plurilateral member-driven sustainability-related trade initiatives				
Dialogue on Plastics Pollution and Environmentally Sustainable Plastics Trade (DPP)	83	Angola, Cabo Verde, Cameroon, Central African Republic, Chad, Mauritius, Morocco, Mozambique, The Gambia [26]	Reduce plastics pollution and promote environmentally sustainable plastics trade. This initiative is especially relevant given that the United Nations (UN) negotiations for a legally binding instrument on plastic pollution, including in the marine environment, have been stalled.	· Reaffirmed commitment towards international cooperation to reduce plastics pollution and promote environmentally sustainable plastics trade. · Produced technical outcome documents on: monitoring plastics trade flows; designing trade-related plastics measures; approaches to regulating single-use plastic products; goods, services and technologies for waste management and clean-up activities; and opportunities to scale up environmentally sound non-plastic substitutes and alternatives to single-use plastics.
Fossil Fuel Subsidy Reform (FFSR)	48	None	Rationalise and phase out harmful fossil fuel subsidies and share information among members.	· Produced an updated list of sample questions on fossil fuel subsidies for use in WTO Trade Policy Reviews. · Developed guidelines for designing transparent, targeted and temporary fossil fuel subsidy measures in response to energy crises.

Initiative	WTO members	African members	Overview and purpose	Progress at MC14
Sustainability-related trade initiatives on the margins of MC14				
The Coalition of Trade Ministers for Climate	64	Angola, Cabo Verde, Cameroon, Kenya, Morocco, Mozambique, Rwanda, The Gambia, Zambia	· High-level platform launched in 2023 to bring together trade ministers from diverse regions to better align international trade policies, the global climate agenda and sustainable development. · Drive inclusive international cooperation to align global trade policies with climate goals.	· Reaffirmed that trade policy must support climate mitigation and adaptation. · Committed to strengthen private sector engagement. · Pledged to strengthen WTO discussions on sustainable agriculture, technology transfer and climate-related trade measures.
Integrated Forum on Climate Change and Trade (IFCCT)	Open to all		· Launched at the 2025 UN Climate Change Conference (COP30) and intended to be a discussion forum on key trade and climate matters. · Provide space for dialogue and solution-building at the intersection of trade and climate change.	· Reviewed progress on its initial phase. · Announced a roadmap that outlines additional key milestones in the early stages of the forum's work.
Dialogue on Emerging Agricultural Trade Issues	12	None	· Build trust and foster mutual understanding of the challenges and opportunities associated with sustainable agriculture, considering the diverse realities and approaches of WTO members. · Builds on the activities carried out under the Dialogue on Sustainable Agriculture in the Multilateral Trading System, including the WTO Retreat on Sustainable Agriculture in the Multilateral Trading System (May 2025)	Made a commitment to advancing deliberations on various emerging agriculture trade issues, including those related to sustainability.

Source: authors' analysis

Implications of the sustainability-related trade outcomes for Africa

This section presents an overview of Africa's engagement in sustainability initiatives at MC14, followed by an analysis of the relevance of sustainability-related initiatives for African members. This includes TESSD, the DPP, the FFSR and various emerging platforms like the Coalition of Trade Ministers for Climate, the Integrated Forum on Climate Change and Trade (IFCCT), and the Dialogue on Emerging Agricultural Trade Issues.

Africa's engagement in sustainability initiatives at MC14

African countries[27] participated actively at MC14. On sustainability, they raised issues through regional and political groupings including the Organisation of Africa, Caribbean and Pacific States (OACPS), the African Group, the LDCs and the Land-locked Developing Countries. Collectively, African countries called for enhanced international cooperation to support developing countries in achieving green, just transitions aligned with their broader sustainable development priorities.[28]

Specifically, African countries set out their collective position on WTO issues – including trade and sustainability – in the Maputo Ministerial Declaration on the Fourteenth WTO Ministerial Conference, adopted ahead of MC14 and grounded in the vision of the African Union's Agenda 2063: The Africa We Want.[29] The declaration called for strengthening the WTO's deliberative function to address systemic imbalances, including on technology transfer, industrial policy space, debt and trade linkages, climate-related trade measures and global value chain concentration. It stated that this should be done in a manner consistent with members' levels of development, particularly in relation to the transfer of environmentally sound technologies to developing and LDC members. It should also be done in accordance with WTO principles and the principle of Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC).[30]

Africa's emphasis on balancing sustainability-related trade issues with its development objectives was also evident in its position on WTO reform, as put forth by the African Group. Specifically, the African Group underscored the importance of addressing emerging issues, such as climate change, through a development lens.[31] Moreover, the group emphasised that climate trade measures must avoid protectionism, reflect the CBDR-RC principle, support Africa's green industrialisation and promote access to innovation by operationalising technology transfer provisions, particularly for green technologies.[32] In terms of process, African countries highlighted that negotiations on emerging issues must be inclusive, transparent and development-focused, and take into account the limited capacity of their delegations in Geneva.[33] However, the African Group did not highlight sustainability in its MC14 priorities.[34]

Relevance of member-driven sustainability-related trade initiatives for Africa

Limited African engagement in sustainability initiatives at the WTO

While African countries participate in WTO committees such as the Committee on Trade and Environment and the Committee on Trade and Development, their participation in member-driven sustainability initiatives remains limited (see Table 1 above). Of the 79 members of TESSD, only 4 are African, and of the 83 members of the DPP, only 9 are African. Furthermore, no African country participates in the FFSR. Their participation in the Coalition of Trade Ministers for Climate is also limited (9 out of 64 members), and none is part of the Dialogue on Emerging Agricultural Trade Issues.

There are multiple reasons for African countries' limited engagement in these sustainability-related initiatives. These include concerns that agreeing to an additional set of rules would further constrain developing countries' policy space, as well as the perception that the new initiatives favour the interests of developed economies at the expense of developing countries and LDCs.[35] Moreover, for African countries, the benefits of participating in sustainability-related initiatives may not always be clear. At the same time, some initiatives could be perceived as directly limiting existing practices. For instance, the FFSR, focused on scrutinising fossil fuel subsidies, risks exposing African countries' own practices.

Low levels of participation, in particular in the plurilateral initiatives, also reflect concern about whether the WTO is the right institution to address some of these issues (e.g. e-commerce and MSMEs).[36] Indeed, some African members have expressed reservations about joint statement initiatives, noting that they risk fragmenting the multilateral trading system and undermining the balance in agenda-setting, negotiating processes and outcomes.[37] Finally, the lack of engagement is also due to limited resources.[38] Many African countries face resource constraints and have small Geneva delegations that are expected to track a broad set of processes simultaneously. The costs of meaningful engagement across the TESSD, the DPP, the FFSR, the Coalition of Trade Ministers for Climate, and the IFCCT add substantially to the limited resources of their delegations.

African WTO members need to weigh the risks associated with both participation and non-participation in these initiatives. The Maputo declaration cautions against 'practices that fragment the system, weaken multilateral disciplines or marginalise non-participating Members'.[39] Active African participation in these member-led sustainability initiatives could risk legitimising precisely the fragmentation that the African Group has resisted. However, non-participation also carries its own risks and could result in outcomes that do not reflect the specific circumstances, challenges and needs of African countries, and miss the opportunity to learn and leverage sustainability-related initiatives to their own advantage.

TESSD: An opportunity for Africa's sustainability-related trade agenda

Taken together, the four TESSD outcome documents produced at MC14 represent a substantive body of technical work on sustainability-related trade issues. Given the challenges of making substantial progress in the multilateral negotiations at the WTO, there is growing value in these non-binding, best-practice-oriented discussions.

Trade-related climate measures

The TESSD compilation and mapping directly addresses one of Africa's central concerns – the proliferation of unilateral climate measures that affect African exporters, which includes border carbon adjustments and deforestation-related market access requirements. The outcome document identifies areas for cooperation that could be leveraged to address the specific compliance and competitiveness challenges that these measures

create for African exporters, such as information-sharing, technical assistance and capacity-building.[40] It also offers space and a framework for discussions on accessing environmentally sound technologies and climate finance, which are relevant for Africa's own green transition and development priorities.

Environmental goods and services (EGS)

The TESSD indicative list on EGS offers a foundational document for further discussions, promotion and facilitation of EGS. This is a significant step forward, in part because it fills a vacuum left by the breakdown of the WTO Environmental Goods Agreement negotiations in 2016. Indeed, one of the reasons for the lack of progress on these negotiations was disagreement over what constitutes an environmental good.[41]

African countries do not have a competitive advantage in many of the EGS currently on the TESSD indicative list, as the list focuses on manufactured, technologically dominant EGS such as goods related to solar, wind, hydro, geothermal and marine energy, production, trade and the use of green hydrogen.[42] Even in the case of goods for sustainable agriculture, the list includes drones, sensors and analysis tools for precision and smart agriculture, and weather and climate monitoring tools.[43] On services, examples include engineering and related services, scientific and technical services, installation and assembly, and consulting.[44] An area of clear relevance for Africa in the indicative lists is biofuels, where African countries hold export potential.[45]

By contrast, African countries are more likely to have a comparative advantage in environmentally preferable products such as natural fibres (e.g. jute and sisal), eco-friendly agricultural products and sustainably harvested timber.[46] Therefore, active participation in the TESSD Working Group on Environmental Goods and Services can enable African countries to advocate for the inclusion of their EGS products on the TESSD indicative list.

Moreover, addressing the import barriers for the EGS included in the indicative list may also allow African countries to develop their renewable energy, green hydrogen and sustainable agriculture sectors, encouraging investment, supporting domestic businesses' competitiveness and harnessing the countries' production and export potential.[47] This is particularly important given that many African countries are trying to develop these sectors domestically. For example, countries such as Egypt, Morocco, Namibia and South Africa have already launched large-scale green hydrogen projects.[48] Access to EGS may also provide an opportunity to address energy poverty and energy security concerns. At the same time, market opening in EGS must be balanced with African countries' own industrial policy objectives, requiring a careful weighing and balancing of the trade offs.

Circular economy

The TESSD outcome document on the circular economy identifies gaps in achieving circularity and compiles best practices, focusing on textiles, batteries, renewable energy and electronics. The sectoral scope of this document is relevant to many African countries and their push to develop more circular industries through trade.[49] In addition to emerging national circular economy initiatives, the continent is developing its own framework and action plan for its circular economy transition through the Continental Circular Economy Action Plan for Africa (2024–2034).[50] African countries can use the best practices in trade and circularity identified in TESSD as a reference point to advance their transition to a more circular economy while avoiding undesired waste.

For example, in the textiles and apparel industry, countries such as Egypt and South Africa have developed significant export industries that will likely be directly affected by circular-economy-related market access requirements,[51] including the EU's Ecodesign for Sustainable Products Regulation, which will condition access to the EU market on sustainability and circularity requirements. The outcome document of the

TESSD Working Group on the Circular Economy highlights relevant practices and examples of sustainable textile strategies worldwide, as well as criteria to address gaps in extended producer responsibility, and examples of such schemes for textiles.[52] This comparative overview could be a helpful starting point for African countries as they prepare their textile industries to meet emerging product circularity standards in key export markets like the EU.

Furthermore, the influx of second-hand clothing has consistently been described as a challenge across various African countries. Addressing this through the current Harmonized System (HS) is challenging, given that both used and second-hand clothing of good quality, and waste are traded under the same HS code: HS 6309 (worn textiles and clothing). As a result, it is challenging for customs officials to distinguish between the two. The outcome document highlights the importance of enhancing traceability in the used textiles trade, which could enable improved differentiation between 'desired' and 'undesired' used textiles and help African countries avoid undesired waste imports. While the outcome document itself will not directly lead to HS reform, the information collected, including about trade and sustainability challenges, could be a useful resource for African countries to consider in light of their own circular economy ambitions. Moreover, it could be particularly relevant for African LDCs, which are struggling to reap the benefits of circular trade.[53]

Subsidies

At MC14, TESSD produced a document outlining elements that members should consider when designing subsidies related to the transition to a low-carbon economy. These elements are organised into three categories: rationale and design elements; impact considerations; and implementation and governance considerations.[54] These discussions are relevant to Africa on two levels. These guidelines could be relevant in addressing subsidies that risk diverting investment away from African producers, and in creating competitive disadvantages for African exporters, as highlighted in the Maputo declaration.[55]

In addition, the African Group has called for a review of industrial subsidy rules to support emerging strategic industries and MSMEs, which are crucial to Africa's development.[56] In this context, the group noted that reform debates should distinguish between distortions caused by excessive market-distorting subsidies and outcomes driven by productivity improvements, business model innovations and technological change. The group underscored the importance of ensuring that the new disciplines do not constrain policy space for industrialisation.[57] These positions reflect Africa's broader concern that the WTO reform debates on levelling the playing field, which remained unresolved at MC14, must not foreclose the industrial policy options that African countries require to diversify their economies and build competitive industries.[58] Given these concerns, the TESSD's work in the area of subsidies is highly relevant to African countries.

DPP: Managing plastic pollution and shaping the regulatory response

Africa faces a severe plastic pollution challenge, with the continent projected to generate 116 million tonnes of plastic waste annually by 2060, six times more than the 18 million tonnes produced in 2019.[59] The DPP's five technical outcome documents from MC14 cover the monitoring of plastics trade flows; the design of trade-related plastics measures; approaches to regulating single-use plastic products; goods, services and technologies for waste management and clean-up activities; and opportunities to scale up environmentally sound non-plastic substitutes and alternatives to single-use plastics. These issues are directly relevant to the policy choices that African countries are making and will need to make as they develop their own domestic responses. The DPP's work also takes on added significance given the lack of progress in the negotiations for a multilateral, legally binding treaty to address plastics pollution.

A transition away from plastics also offers an opportunity for Africa to align economic and sustainability objectives by encouraging exports in natural fibres and bio-based materials, due to the continent's potential in these sectors.[60] In 2022, global exports of non-plastic substitutes totalled US$560 billion, with Africa accounting for only 3% of the trade.[61] The DPP's workstream on non-plastic substitutes is a space where African countries could highlight the potential area for market growth and the need to increase value-added activities in this sector since raw materials such as minerals, natural fibres derived from forestry resources, and seaweed account for more than two-thirds of the trade in non-plastic substitutes.[62]

FFSR: Confronting difficult policy challenges

The lack of African countries' participation in the FFSR reflects the challenges that this issue poses for them. Several African governments provide fuel subsidies to manage energy costs, particularly amid energy poverty and limited access to affordable alternatives.[63] Reform for these countries may mean higher prices for consumers, which may impact access to energy in African countries with high levels of poverty.

The FFSR's work on transparency, specifically the updated questions on fossil fuel subsidies for use in WTO Trade Policy Reviews, means that African countries' fossil fuel subsidy practices may be subject to increased scrutiny through the WTO's review mechanism. The FFSR's MC14 output on temporary crisis measures, in the form of guidelines for designing transparent, targeted and temporary fossil fuel subsidy measures in response to energy crises,[64] is similarly relevant, given the recent geopolitical events impacting fossil fuels and energy security concerns in Africa.

African participation could help ensure that the outcomes reflect Africa's development challenges. Indeed, African countries could demand gradual reform of fossil fuel subsidies, provided they receive financial support for developing alternative energy sources.[65] This is particularly important for the continent because it possesses abundant natural resources that remain under-utilised to meet its energy needs.[66]

Initiatives on the margins of MC14

African countries could consider increasing their participation in emerging forums such as the Coalition of Trade Ministers on Climate and the IFCCT to ensure that their concerns and interests are heard and that they contribute to shaping the trade and climate agendas. Doing so, however, requires a careful calibration of how to spend the group's limited resources.

Another new forum that could hold significance for African countries is the Dialogue on Emerging Agricultural Trade Issues. Agriculture is central to African economies, accounting for a significant share of employment, livelihoods and export revenues across the continent. The intersection of agricultural trade policy with environmental and sustainability requirements is an area of growing importance for African exporters. The Maputo declaration specifically highlighted agriculture as a priority area for WTO reform and underscored the importance of protecting the rights of net-food-importing countries and integrating food security into approaches to climate resilience and sustainable agriculture.[67]

These considerations fall within the scope of the dialogue's agenda, and participation from its early stages could offer an opportunity to safeguard African countries' agricultural interests.[68] However, it is too early to tell whether participation in the new forum would be effective in addressing the African Group's agricultural concerns in areas where engagement in the Committee on Agriculture has failed, or whether engagement would risk diluting the group's already limited resources that might be better spent by continued engagement in the committee.

Conclusion

Sustainability was not central to MC14's multilateral negotiations. The most substantive progress took place through member-driven initiatives – the TESSD, DPP and FFSR, which produced technical documents, best-practice compilations and non-binding ministerial statements that could increasingly shape the trade-sustainability landscape. African participation in these and other sustainability-related initiatives remains limited, reflecting concerns about their effectiveness, impact on the principle of multilateralism and resource limitations. African members need to strategically weigh these costs against the potential benefits of ensuring that Africa's specific trade and sustainability concerns and opportunities are heard and reflected in these discussions.

The Maputo declaration, the African countries' communications, and previous ministerial statements and declarations already contain the foundations for a forward-looking African sustainability-related trade agenda. The question is which mechanism(s) and frameworks would best advance concrete and comprehensive progress on that agenda at the WTO. The existing framework and ongoing member-driven sustainability initiatives could be leveraged by African members to strengthen the linkages between trade and African countries' own sustainability agendas. This is especially the case as trade is an under-utilised lever available to Africa for aligning its sustainability and development agenda. Thus, even without official sustainability outcomes at MC14, there are numerous opportunities for African members to proactively strengthen linkages between trade and sustainability outcomes – not only in reaction to third countries' trade policies but also to build Africa's own sustainable future.

At the same time, when considering whether and how to participate in sustainability-related initiatives and mechanisms, it is imperative for the African Group to carefully assess the effective use of its limited resources. In doing so, it is important not to limit engagement to WTO forums and initiatives but to also take a broader approach that includes weighing and balancing engagement in other existing platforms, such as the Paris Agreement, that also address the trade sustainability–climate nexus.

Finally, engagement with regard to sustainability initiatives at the WTO will be most effective for African countries if it builds on clear strategic approaches to strengthening trade and sustainability linkages, developed at national or regional levels. This, in turn, highlights the importance of continued engagement at the national level, within regional economic communities, and within the African Continental Free Trade Area – which could serve as building blocks to shape the African Group's sustainability agenda at the WTO and beyond.

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5

Turbulence ahead: The risks and opportunities of global aviation decarbonisation for African economic development

Liz May

Summary

Aviation is vitally important for Africa's economic development including aircraft component manufacturing, aviation services, the transport of high-value exports and tourism. The continent has ambitious plans to invest and expand the sector to support trade integration and industrialisation. In parallel, global and unilateral aviation decarbonisation initiatives are accelerating. In July 2026, the European Union (EU) will decide whether to extend its emissions trading system (the EU ETS) to cover international flights, with far-reaching consequences. Furthermore, the number of countries with sustainable aviation fuel (SAF) mandates is increasing rapidly.

Because African aviation is at an earlier stage of development, it faces a number of structural constraints that mean decarbonisation initiatives will have a disproportionate impact. Even implementation of the United Nations' limited Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is estimated to cost as much as 18% of African airlines' already constrained annual profits. Increased fuel costs will have knock-on impacts on vital exports and tourism, which will be widely felt, including by the continent's least-developed countries and small island developing states. It is crucial that African policy-makers have a clear and granular assessment of the risks posed by these frameworks and advocate in a unified way.

Several countries on the continent have significant potential to benefit from the growth in demand for SAF, but this is very far from being realised, with production currently less than 1% of the global total

Several countries on the continent have significant potential to benefit from the growth in demand for SAF, but this is very far from being realised, with production currently less than 1% of the global total. Increased SAF production would support energy sovereignty and economic resilience, supporting industrial upgrading and the creation of high-quality jobs. However, there are considerable obstacles to scaling up: lack of domestic demand frameworks, high risk premiums and cost of capital, technology control and gaps, and the ongoing export of vital feedstocks. The African Union and African countries are beginning to put in place the necessary policies and investment to counter these obstacles, but if Africa is to realise its SAF potential, these measures need to be strengthened and accelerated and policy space needs to be created.

The importance of aviation to African economic development and integration

African aviation is in relatively early stages of development in global terms, accounting for around 2% of global air passenger traffic, despite the continent holding 17% of the world's population. However, African aviation is poised for rapid growth and is already making a significant contribution to the continent's development. According to the International Air Transport Association (IATA), the sector contributes 8.1 million jobs and US$75 billion (2.6%) of Africa's gross domestic product (GDP).[1] Africa's passenger traffic is expected to double by 2044, outpacing the global average with 4.1% annual growth.[2] This is driven by a growing middle class, rising tourism and expanded business connectivity.

Air freight is also an important and fast-growing component of the African trade landscape, providing speed, reliability and access to global markets. While it is generally more expensive than sea or road transport, air freight is vital for high-value, time-sensitive or perishable exports. Africa's air cargo market grew by 8% in 2024–2025, and saw a 28% rise in outbound cargo to North America, a 20% rise to Central and South America and just under 12% rise in intra-African traffic.[3]

Aviation contributes to African economic development both directly though aircraft component manufacture and servicing and airline- and aviation-related jobs and services, and indirectly through the trade, business connectivity and tourism that is facilitated by air transport.

Aviation and aviation-linked industries

Africa has several successful airlines, a growing aircraft component manufacturing sector and an aviation support service sector that provides a range of high-quality jobs. South African companies manufacture aircraft components and supply major players including Airbus and Boeing. Both Morocco and Tunisia have leveraged their proximity to Europe and manufacture high-value components. Ethiopia's National Investment Group is building a major hub for aircraft parts, and Nigeria is investing in the local production of aircraft components and maintenance, repair and overhaul facilities.

Ethiopian Airlines led the development of aviation-linked industries on the continent, establishing an aviation academy in 1956 and a dedicated pilot school in 1964. These initiatives developed into what is now Africa's largest aviation training institution, the Ethiopian Aviation University, training pilots, technicians, cabin crew and sales agents. There are also leading aviation schools in South Africa (Lanseria Flight Centre, Blue Chip Flight School), Nigeria (Nigerian College of Aviation Technology), Egypt (Egyptian Aviation Academy) and Kenya (East African School of Aviation).

Trade

Although 90% of Africa's trade by volume is transported by sea,[4] air transport is very important for certain high-value exports. In 2021, nearly 27% of South Africa's total ZAR 1 812 billion exports were transported by air. These included perishables, vehicle parts, semi-conductors, machinery, gold, clothing and chemicals.[5] In 2023, 46.3% of Ghana's total exports by value were transported by air, largely gold.[6] Air-transported perishable fresh produce exports such as cut flowers and horticulture make up 16.6% of Kenya's total exports, 15.3% of Ethiopia's and 11.6% of Tanzania's.[7]

Air freight is also an important buffer for other forms of transport, ensuring supply continuity in times of crisis or where there are demand spikes. The premium price paid for air freight makes up a small proportion of the value of these high-value, low-volume goods. However, in the case of perishables, transport costs – and any increases to this as a result of decarbonisation initiatives – play a decisive role in their global competitiveness.[8]

Tourism

In-bound aviation supports Africa's travel and tourism industry, which contributes an estimated 6% to GDP and employs over 22 million people.[9] The sector is the economic backbone of certain small islands and smaller economies, contributing 62% to Seychelles' GDP, 43% for Cabo Verde, 27% for Mauritius, 20–25% for The Gambia and 10–15% for both Tanzania and Kenya.[10]

Africa's aviation vision

> *Aviation is not merely a mode of transport, it is a strategic engine of continental integration and a core enabler of Agenda 2063 and the AfCFTA.*
>
> (Lerato D. Mataboge, African Union Commissioner for Infrastructure and Energy)[11]

Intra-African air connectivity has been historically difficult, with limited and expensive flights and transport systems designed to connect to colonial Europe. This has changed significantly in recent years, and Africa has ambitious plans to develop the aviation sector through the Africa Union's (AU) Single African Air Transport Market (SAATM) and the implementation of the African Continental Free Trade Area (AfCFTA).

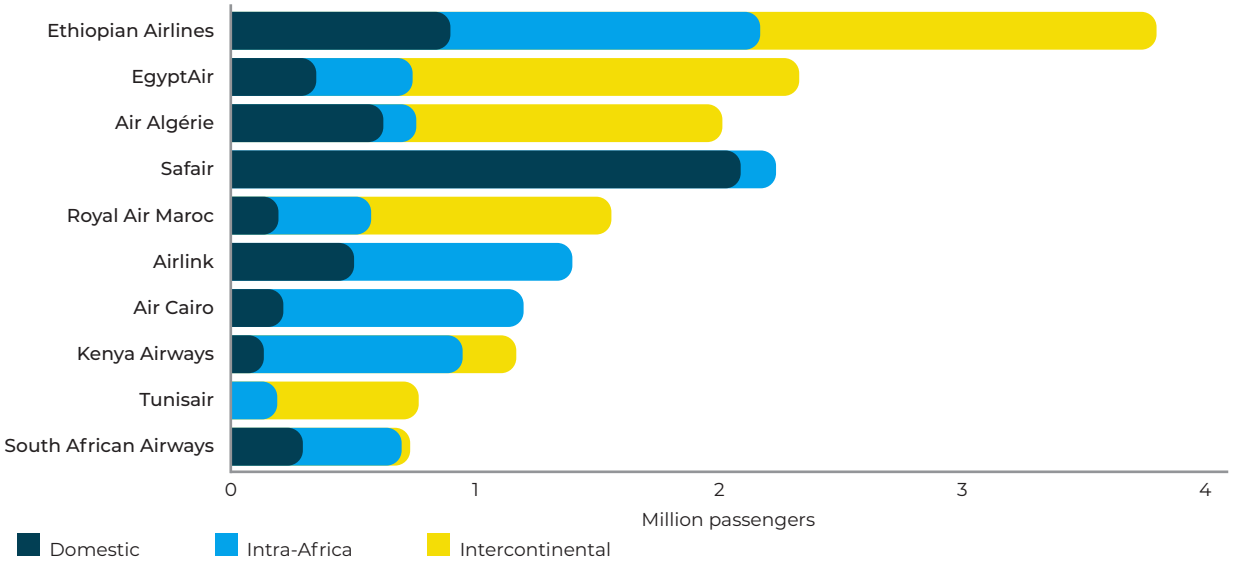
Announced in 2018, the SAATM is a plan to create a single, unified, liberalised civil aviation market in Africa. It aims to boost intra-African trade and tourism, reduce travel costs and drive economic growth. Full implementation is expected to increase intra-African passenger traffic by 51% and reduce airfares by 26%.[12] The initiative is supported by an investment of US$30 billion to modernise the continent's aviation infrastructure, including increasing Rwanda's Kigali International Airport's capacity and building a new US$10 billion mega-airport in Bishoftu, Ethiopia.

Full AfCFTA implementation is expected to nearly double air freight volumes from 2.3 million tonnes (Mt) to 4.5 Mt by 2030. The United Nations (UN) Economic Commission for Africa calculates that aircraft fleet size would have to increase by 141% to accommodate the increased volumes. The main growth routes are predicted to be within West Africa, from North Africa to West Africa, and within Southern Africa.[13]

Who's who in African aviation

- 80% of all air travel to and from Africa is currently via non-African airlines.
- Ethiopian Airlines is the dominant African carrier, with 18–20% of total African airline capacity.
- The primary air freight providers in Africa include Emirates SkyCargo, Turkish Cargo and Qatar Airways Cargo, competing with African operators such as Ethiopian Cargo and Logistics Services, Kenya Airways Cargo and Morocco's Royal Air Maroc Cargo.
- African countries hold eight seats on the 36-member council of the International Civil Aviation Organization (ICAO).
- Continental aviation policy is led by the AU's Infrastructure and Energy Department through its specialised agency, the African Civil Aviation Commission based in Dakar, Senegal.
- The African Airlines Association (AFRAA) is the industry body for airlines across the continent.

Figure 1: Africa's major commercial airlines ranking by traffic (Q4 2024)



Source: AFRAA[14]

Headwinds: International aviation decarbonisation initiatives

Aviation's rising share of global emissions has made it a target for ambitious decarbonisation commitments. African aviation is currently being impacted by market-based decarbonisation mechanisms (CORSIA and the EU ETS) as well as fuel-based mandates (ReFuelEU and others) that enforce the use of SAF.

CORSIA

How it works

The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is a global market-based framework adopted by the UN's specialised agency ICAO in 2023. This initiative serves as a cornerstone of the aviation industry's broader commitment to achieving net-zero emissions by 2050. To stabilise net carbon dioxide (CO_2) emissions from international flights, CORSIA requires airlines that are emitting more than 10 000 tonnes annually to purchase eligible 'emissions units' to offset any growth above an established baseline.[15] Since 2019, all ICAO member states have been required to monitor, verify and report their carbon output. The offsetting requirement launched in 2021 and is rolling out in three phases: the pilot phase (2021–2023), the first phase (2024–2026) and the second phase (2027–2035).

CORSIA utilises a route-based approach, applying exclusively to international flights between participating ICAO member states. While the scheme primarily relies on offset projects like reforestation and renewable energy, airlines can also proactively lower their obligations by adopting SAF or implementing technical improvements such as fuel-efficient aircraft and optimised air traffic management. Data from 2025 indicates high levels of coverage and compliance, with 128 states reporting their 2024 emissions data, representing 99% of total international aviation CO_2 output.[16]

Despite this participation, the scheme faces mounting scrutiny from climate ambitious states and campaigners who argue that a reliance on offsets, which are frequently criticised for lacking environmental credibility, is a weak substitute for direct tangible emission reductions. CORSIA also faces significant logistical hurdles: only 10 offset programmes have won approval, creating a projected shortfall in available emissions units. This scarcity is exacerbated by the requirement for host countries to issue letters of authorisation, confirming that the carbon reductions used for aviation offsets will not be doubly counted towards the host nation's own Nationally Determined Contributions.

Participation of African countries in CORSIA

Offsetting becomes mandatory from 2027; however, no African country is obliged to comply, due to a wide range of (overlapping) exemptions. Of the AU members, 48 qualify for exemption based on their individual status as a least-developed country (LDC), small island developing state (SIDS) or land-locked developing country (LLDC). The few remaining countries (Algeria, Egypt, Equatorial Guinea, Gabon, Ghana, Morocco, South Africa and Tunisia) are all likely to fall under the low-activity rule, which exempts states that accounted for less than 0.5% of global international revenue tonne-kilometres (RTKs) in 2018.

Only Ethiopia (0.9% RTK) exceeds that low-activity threshold, but it is covered by its LDC status. Future compliance obligations will arise only if Egypt (0.44%) and South Africa (0.28%) graduate from low-activity status, and if Ethiopia graduates from LDC status. Despite these widespread exemptions, 31 African states are participating voluntarily in phase 1 of CORSIA, signalling their commitment to the multilateral process.

EU ETS

How it works

In 2012, the EU extended its emissions trading system (ETS) to cover the aviation sector. The European Union Emissions Trading System (EU ETS) operates on a 'cap and trade' principle in which the EU sets a limit (cap) on the total annual amount of CO_2 that can be emitted by all airlines covered by the system. The cap will gradually be reduced. Airlines must monitor their emissions, submit an annual, independently verified emissions report and surrender tradeable permits known as EU Allowances (EUAs) that are equal to their total emissions. If an airline reduces its emissions, it will have spare EUAs that it can sell, or airlines that have high emissions can buy EUAs from a central auction. As of 1 January 2026, all free emissions allowances have been phased out.

Probability of EU ETS extension to cover international flights

Originally, the EU ETS applied to all international flights. However, a significant backlash from China, India, Russia and the United States (US) forced a stop-the-clock suspension, restricting the scope to flights within the European Economic Area (EEA). This geographical limit does not exempt foreign carriers; any airline operating intra-EEA routes must comply.

This restricted scope is a temporary measure designed to give ICAO's CORSIA scheme time to develop. By July 2026, the EU is mandated to evaluate CORSIA's alignment with the Paris Agreement on climate change and, if found lacking, to extend its coverage. The review hinges on two key criteria: whether CORSIA provides a meaningful pathway to reduce emissions rather than just offset them, and if it covers at least 70% of international aviation emissions.[17]

Given that CORSIA remains focused on offsets, it is likely to fail the first criterion, even if its near-universal coverage satisfies the second. Considering this – and the precedent set by other EU unilateral extra-territorial measures such as the Carbon Border Adjustment Mechanism (CBAM) and the Deforestation Regulation – it is highly probable that the EU will recommend extending the ETS at least to all departing flights. If it does so, this will significantly increase the revenues generated, including those collected from African airlines. These funds are directed to EU member states for climate-related spending and to the EU Innovation Fund, which supports EU production of low-carbon technology.

The United Kingdom (UK) also has an ETS, which covers flights within the UK, between the UK and Gibraltar and between the UK and the EEA and Switzerland. The UK is committed to expanding its ETS to cover all

international aviation emissions by 2033.[18] In May 2025, the UK and the EU announced their commitment to link their ETS schemes as part of the Common Understanding between the European Commission and the United Kingdom, and aviation is specifically mentioned as part of this process.[19] Should the EU move to extend its ETS from 2026, it is reasonable to assume that the UK will accelerate its target.

Double burden question

If the EU decides to extend new ETS obligations, African LDCs and SIDSs not implementing CORSIA will be exempt indefinitely, but all other African countries and those voluntarily participating in the CORSIA scheme face a potential 'double burden'. The EU has suggested that countries may be able to deduct any CORSIA offsetting costs incurred from their ETS obligations, but there will still be two systems in operation with costly administrative processes.

African countries could argue instead that they should be exempt from ETS obligations on routes covered by CORSIA, or that there should be a wider range of country exemptions mirroring the CORSIA approach. Another possible approach would be for African countries to develop their own carbon pricing or aviation emissions reduction scheme and invoke EU ETS Directive Article 25a, which allows the EU to exempt flights arriving from a third country that has equivalent measures in place.[20] There will also be a strong case for widening the use of ETS aviation funds to support developing countries' own decarbonisation and SAF production ambitions.

SAF mandates (including ReFuel EU)

The final piece of the aviation decarbonisation puzzle is the growing patchwork of SAF mandates, which require airlines to use a percentage of SAF when they refuel aircraft. These mandates are creating demand that is not currently being matched by adequate production, leading to high prices. It is hoped that as production catches up, SAF prices will decrease, although whether this delivers cheap SAF for Africa will depend on the extent to which continental production can be developed (see the section on capitalising opportunities for SAF below).

- The ReFuelEU Aviation Regulation was introduced in 2023 as part of the EU's Fit for 55 package, which aims to reduce the region's greenhouse gas emissions (GHG) by at least 55% by 2030. The regulation requires:
  - Aviation fuel suppliers to ensure that fuel available at EU airports contains a minimum of 2% SAF, increasing significantly to 70% by 2050; and
  - Airline operators to ensure that the annual quantity of fuel uplifted at an EU airport is at least 90% of the fuel required for the flights departing from that airport. This is to prevent 'tankering', where airlines evade the SAF requirements by avoiding refuelling at EU airports.

  There are non-compliance fines for fuel suppliers and aircraft and airport operators.

- Similar to ReFuelEU, the UK required fuel suppliers to provide a 2% SAF blend in 2025, increasing to 10% by 2030 and 22% by 2040. To support this, the UK government is implementing a revenue certainty mechanism to help keep SAF prices stable for airlines.
- Starting 1 October 2026, Singapore will require a 1% SAF target for all departing flights. The country is using a SAF levy model, where passengers pay a fixed fee based on distance and cabin class, and the government uses that pool of money to centrally procure the fuel.

- Under the 'fuel of the future' law, enacted late 2024, Brazil is implementing an emissions reduction mandate rather than a fuel volume blend. Domestic aviation operators must reduce their CO_2 emissions by 1% from 2027, increasing annually to 10% by 2037.
- India has approved a phased mandate for international flights departing from the country. They must use a blend of at least 1% in 2027, 2% in 2028 and 5% by 2030.
- Japan has set a target that domestic airlines must use 10% SAF by 2030. It has also proposed a supply-side obligation designed to support this – suppliers with over 100 million litres of annual jet fuel sales must reduce their GHG emissions by 5% by the April 2030–March 2035 period compared to 2019 levels.
- Ethiopia's draft biofuel strategy includes a 5% SAF blend target for all flights by 2030.
- South Africa is considering allowing airlines to offset their carbon tax liabilities under the country's Carbon Tax Bill if they used locally produced SAF.
- Kenya is drafting a framework for a future SAF mandate.
- The AU has also set a continental target of 2–5% SAF contribution to Africa's total aviation fuel needs by 2030.

Impact of decarbonisation measures and African responses

African nations will be impacted by decarbonisation schemes both directly, through increased airline operating costs, and indirectly, as costs are passed on to African exporters, tourists and businesses reliant on air travel.

Direct costs to African airlines

- Ethiopian Airlines already faces EU ETS obligations on its small number of intra-EEA flights. Data from the EU Transaction Log confirms that the airline has been logging emissions and purchasing ETS units. While it is currently the primary African carrier that is affected, an ETS extension in 2027 would rapidly drive up decarbonisation costs across the continent.
- ReFuelEU and other SAF mandates are also beginning to drive up fuel costs for African carriers and are adding costly new administrative demands for detailed, third-party-verified, flight-by-flight data monitoring.
- The final costs for CORSIA's phase 1 are becoming clearer. In late 2025, the ICAO confirmed the 'sectoral growth factor' for 2024 as 0.154 (this represents the percentage by which international aviation emissions have exceeded 85% of the 2019 baseline). This means every airline participating in CORSIA must purchase offsets equivalent to 15.4% of their total emissions from eligible routes.[21] The ICAO estimates that this equates to 55.6 Mt of carbon, which could lead to a total industry-wide liability of around US$1.39 billion (at the current market average of US$25 per credit for 2024).[22] Industry sources expect that total offset costs for phase 1 could reach US$4–5 billion, or higher if there is a shortage of eligible credits.

  Extrapolating what this estimation will mean for African airlines is difficult, as a high proportion of African airlines' emissions are not on eligible routes (i.e. they include at least one state not currently voluntarily participating in CORSIA). For Ethiopian Airlines, according to its submissions to the ICAO, its total emissions for 2024 are 7 556 367 tonnes of carbon, of which only 591 170 tonnes (8%) are deemed eligible,[23] leaving them with a bill of approximately US$2.3 million. This amount is expected to increase by 20–30% annually, leading to a total phase 1 cost of US$8.4–9.2 million.

  Across all African participating airlines, a phase 1 cost of at least US$80 million seems plausible given that African airlines account for 2–3% of all passenger airline traffic; although the bulk of this will likely fall on a small number of larger airlines. Costs will increase rapidly in phase 2 when the inclusion of India, China, Russia and other African countries will significantly expand the number of eligible routes.

Disproportionate impact

Africa's aviation sector confronts a challenge fundamentally different from its global counterparts. Whilst developed economies retrofit mature infrastructure for climate compliance, African nations must simultaneously expand connectivity to drive economic development and build sustainable systems from scratch.

(Ethical Business)[24]

Owing to its early stage of development, the African aviation sector faces a number of structural constraints that make decarbonisation more challenging compared to more mature markets.

- Cost of capital: research by Chikage Miyoshi at Cranfield University points to significant differences in the impact that the EU ETS has on developed versus developing country airlines. Using Kenya Airways as an example, Miyoshi found that African carriers struggle disproportionally with high costs of capital, making it more difficult to invest in fuel-efficient aircraft compared to developed country carriers.[25]
- Higher SAF costs: given negligible SAF production on the continent, African carriers have to pay to import SAF, which is already costlier, meaning they face a double burden. According to IATA, airlines in regions without local production, including most of Africa, are paying up to five times the price of conventional jet fuel to acquire SAF. This is exacerbated by smaller fleet sizes, which prevent African airlines from absorbing the high cost of SAF or negotiating bulk discounts.
- High growth phase: because African airlines are growing faster than their counterparts, the amount of emissions that are eligible for offsetting under CORSIA is also growing faster.
- Thin profit margins: according to IATA, net profit across all African airlines was US$100 million in 2024. Figures for 2025 and 2026 are expected to be in the region of US$200 million annually.[26] A CORSIA offset bill of US$80 million for this period represents 16% of the sector's profits. This can be compared to IATA estimates for the industry globally, which suggest that the total costs associated with addressing offset requirements could represent 2–13% of net profits.[27]

Indirect impacts on African economies

Airlines are increasingly passing environmental costs to their customers. For example, Germany's Lufthansa introduced an environmental cost surcharge of up to EUR 72 per flight starting in January 2025.[28] The potential knock-on effects for Africa include:

- Tourism: higher flight costs may deter tourists. European tourists account for up to 15% of arrivals in certain African nations.
- Trade: increased freight costs could threaten the competitiveness of high-value exports such as East African horticulture.
- Development stagnation: redirecting limited capital towards climate compliance may restrict the ability of airlines to invest in the infrastructure that is essential for accelerating intra-African connectivity, trade and industrialisation as per the SAATM, the AfCFTA and the Africa Green Industrialisation Initiative.

African response

The AU has expressed its support for CORSIA as the 'sole global measures to address emissions,' warning that a proliferation of unilateral measures will create an undue burden on a sector still in its growth phase.[29]

In a submission to the 42nd ICAO Assembly, the African Civil Aviation Commission, on behalf of 54 African states, also underscored that CORSIA should be the only global market-based measure and highlighted 'emerging concerns regarding the introduction of overlapping regional Market Based Measures, which may compromise the environmental integrity, economic fairness, and cohesion of global climate action in international aviation'.

> *For African aeroplane operators, many of which operate in aviation markets that are still in the growth stage, these overlapping requirements create market distortions, increase administrative and economic burdens, and undermine the effectiveness of CORSIA and ICAO's central role as envisioned in the Chicago Convention.*[30]

Airline chief executive officers (CEOs) including Allan Kilavuka (Kenya Airways) and Mesfin Tasew Bekele (Ethiopian Airlines) have also been vocal in their concern about the disproportionate impact of aviation decarbonisation schemes on African airlines. CEOs are calling for investment in domestic SAF production to increase availability and reduce costs.[31]

> *There are airlines that are flying 800 aircraft while we are flying 40–50 or even just aircraft. Can we get subsidies because we don't have scale[?] African airlines are still struggling with many issues, and nobody has the money to purchase SAF at this point in time. If we are going to use SAF, which is 4–7 times more expensive than jet fuel, we are going to need subsidies.*
>
> (Allan Kilavuka CEO of Kenya Airways)[32]

Can Africa capitalise on opportunities for SAF?

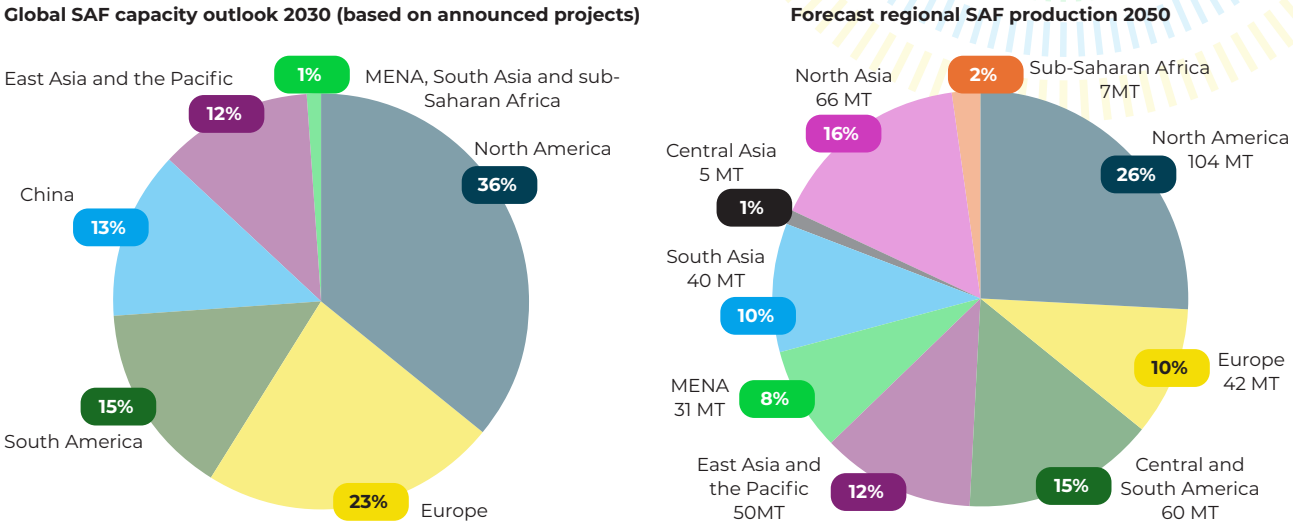
Africa is likely to bear disproportionate costs due to global aviation decarbonisation initiatives. The continent has strong potential to reap some rewards from the rapidly growing demand for SAFs, but this will only materialise if countries are able to overcome the barriers that are currently keeping Africa at a tiny fraction of SAF production. Rewards are likely to be concentrated in a handful of already-industrialising countries.

Global SAF production and market demand

Global SAF production has approximately doubled each year since 2018, reaching an estimated 1 Mt in 2024, equivalent to about 0.3% of total aviation fuel. This growth trend is expected to continue, with SAF production projected to nearly double again in 2025, reaching 0.7% of total fuel use. In 2024, 100 airports globally supplied SAF.[33]

The majority of current SAF production and investment is concentrated in the US, Canada, the EU and Singapore, with the whole of the Middle East and North Africa (MENA), South Asia and sub-Saharan Africa accounting for less than 1% of 2030 global capacity based on announced projects. Looking to 2050, a more diversified picture of global production is forecast, with significant growth occurring in South Asia and the MENA region. However, sub-Saharan Africa is still predicted to account for just 2% of global production. Similarly, SAF market demand is currently concentrated in North America, the EU and Asia, partly because these are the regions with the strongest SAF mandates.

Figure 2: Global SAF production



Source: IATA & Worley Consulting (2025)[34]

There are currently only a handful of SAF pilot projects in Africa and there is no commercial production at scale. The danger is not simply that the continent is behind but also that the current trajectory locks Africa into a familiar extractive pattern of exporting raw materials to serve foreign manufacturing. Africa and the Middle East are projected to hold 14% of global SAF feedstock availability by 2050. However, up to 98% of planned SAF production and 96% of all publicly available offtake agreements are concentrated in countries that are part of the Organisation for Economic Co-operation and Development (OECD).[35]

Africa possesses the potential to break this cycle. By developing local production, the continent would satisfy its own fast-growing aviation demand, boosting energy sovereignty and reducing reliance on volatile, expensive SAF and jet fuel imports. African SAF sovereignty would also conserve foreign exchange and reduce airline operating costs while driving technological innovation and creating high-quality green jobs – both in processing and in feedstock supply chains. Realising this vision requires a precise assessment of regional potential for different technologies, a clear incentive framework and decisive action to identify and dismantle barriers to SAF investment.

In February 2025, African leaders endorsed the AU's Continental Strategy for Sustainable Aviation Fuels and Low Carbon Aviation Fuels, which aims to: transition Africa from feedstock exporter to fuel producer; create domestic SAF production of up to 261 Mt; create up to 20 million jobs; and position SAF to contribute 2–5% to Africa's total aviation fuel needs by 2030.[36]

SAF technologies

There are currently five main SAF production pathways, requiring different technologies and feedstocks, and with different relative future market and production potential in Africa.

Table 1: Main SAF technologies compared

Technology	Technology readiness level (TRL)	Relative cost (HEFA = 1.0)	Key feedstocks	Near-term importance (2025–2030)	Long-term importance (2040–2050)	Strategic assessment
Hydro-processed esters and fatty acids (HEFA)	TRL 9: fully commercial	1.0	Used cooking oil (UCO), animal fats, vegetable oils	★★★★★ Critical	★★★ Moderate	**Most important now.** Dominates current production (approximately 85% of SAF in 2030). Mature technology with established supply chains. Limited by feedstock availability and sustainability concerns for scaling post 2030.
Co-processing	TRL 9: commercial	< 1	Vegetable oils, animal fats, UCO processed with petroleum	★★★★ High	★★ Limited	**Important bridge technology.** Allows rapid deployment using existing infrastructure with minimal capital investment. Good for African markets with refinery capacity (e.g. Nigeria). Low blend limits long-term significance.

Technology	Technology readiness level (TRL)	Relative cost (HEFA = 1.0)	Key feedstocks	Near-term importance (2025–2030)	Long-term importance (2040–2050)	Strategic assessment
Alcohol-to-jet (AtJ) processing	TRL 7–8: demonstration to commercial	1.5–2.0	Ethanol from sugarcane, corn, cellulosic biomass	★★★★ High	★★★★ High	**Increasingly important.** Well-understood technology with scalable feedstock (bioethanol). Particular potential in regions with sugar or starch crops (e.g. Ethiopia, Kenya).
Fischer–Tropsch (gasification)	TRL 7–8: demonstration	2.0–3.0	Biomass, municipal solid waste (MSW), agricultural or forestry residues	★★★ Moderate	★★★★★ Critical	**Key long-term pathway.** Versatile feedstock options including waste streams. Proven technology (used by South African company Sasol). Feedstock diversity is crucial for scaling beyond 2030 when oil-based feedstocks become constrained. Well-suited for African markets with biomass or waste resources.

Technology	Technology readiness level (TRL)	Relative cost (HEFA = 1.0)	Key feedstocks	Near-term importance (2025–2030)	Long-term importance (2040–2050)	Strategic assessment
Power-to-liquid (PtL) or e-SAF processing	TRL 6–7: pilot to demonstration	3.0–4.0	Renewable electricity, water (for hydrogen), captured CO_2 (direct air capture or industrial sources)	★ Very low	★★★★★ Critical	**Future game-changer.** Currently the most expensive but greatest long-term potential. Not feedstock-limited (uses renewable energy and CO_2). Electrolysis and direct air capture costs expected to drop significantly. Suitable for regions with abundant renewable energy (e.g. Morocco, South Africa, Egypt).

Source: compiled from IATA & Worley Consulting (2025)[37] and Refuel EU Mandate[38]

SAF production potential in Africa

Different African countries have particular strengths in the production of different types of SAF. South Africa has world-class Fischer–Tropsch (FT) expertise developed by Sasol, as well as e-SAF potential thanks to the expansion of green hydrogen (e.g. in Saldanha Bay). The country also represents one of the largest SAF markets in Africa due the high volume of traffic that moves through Johannesburg's O.R. Tambo International Airport. Nigeria has possibilities for co-processing at the Dangote Petroleum Refinery, and the Murtala Muhammed International Airport in Lagos is a regional hub for West Africa.

Further north, Morocco has affordable solar power to support e-SAF production and could leverage its geographic proximity to Europe to be a supplier to the European market in addition to domestic demand. Royal Air Maroc's first SAF flight was completed in February 2025. In the east, both Ethiopia and Kenya have a good supply of feedstocks and strong renewable energy giving them considerable AtJ potential. Meanwhile, Egypt provides about 40% of MENA's agricultural residues and is one of the region's largest MSW producers, alongside Saudi Arabia.

Snapshot of African countries with SAF production potential

COUNTRY PROFILE

South Africa



FEEDSTOCK

Green hydrogen: 10-gigawatt (GW) target by 2030

Industrial waste CO_2: 30–40 Mt per year

Renewable electricity

UNIQUE ADVANTAGES

- World-class FT expertise (Sasol)
- Africa's e-SAF pioneer
- Existing industrial and chemical infrastructures and skills
- Export corridors

POTENTIAL PATHWAYS

- FT
- PtL (e-SAF)

PROJECTS AND POLICY

- HyShiFT (Sasol) e-SAF facility in Secunda, Mpumalanga
- ZAR47 billion green hydrogen project in Saldanha Bay, Western Cape

Policy

- Planned tax breaks for SAF in Carbon Tax Bill
- Revised Green Hydrogen Strategy: SAF as key application
- Just Energy Transition Plan

COUNTRY PROFILE

Kenya



FEEDSTOCK

UCO

Castor oil ingredients

UNIQUE ADVANTAGES

- Potential idle Mombasa refinery (25–35% capital expenditure savings)
- Strong castor potential

POTENTIAL PATHWAYS

- HEFA

PROJECTS AND POLICY

- Agri-hub partnership between Eni and the International Finance Corporation: US$250 million investment, 500 000 tonnes of oilseed per year by 2026
- Kenya Airways SAF flight: first African airline commercial flight with SAF in June 2023

Policy

- National SAF Steering Committee: led by the Kenya Civil Aviation Authority in 2024
- State Action Plan for the Reduction of CO_2 Emissions in Aviation 2022–2028: pilot SAF production projects

COUNTRY PROFILE

Ethiopia



FEEDSTOCK

Sugarcane, molasses: operational facilities

MSW: 750 000 tonnes per year in Addis Ababa

96% renewable waste

UNIQUE ADVANTAGES

- Strong demand driver in Africa. Massive anchor customer in Ethiopian Airlines guarantees offtake
- Jet fuel makes up 17% of total imports. Energy security imperative
- Existing bioethanol production infrastructure

POTENTIAL PATHWAYS

- AtJ
- FT

PROJECTS AND POLICY

- National Biogas Program: MSW collection infrastructure development
- Existing bioethanol facilities: 5% gasline blend operational
- Sunbird Bioenergy: US$376 million investment agreement in an AtJ facility in 2025

Policy

- 5% blend for all flights by 2030

COUNTRY PROFILE

Egypt



FEEDSTOCK

- Agricultural residues
- UCO
- MSW

UNIQUE ADVANTAGES

- MENA's agricultural residue leader: 40% of MENA total
- Major MSW generator with minimal recycling
- Existing refinery infrastructure
- Strategic Mediterranean position

POTENTIAL PATHWAYS

- FT (gasification)
- AtJ
- HEFA co-processing
- PtL

PROJECTS AND POLICY

- Planned UCO collection pilots: Al Mana Holding will invest US$20 million in a SAF plant in the Suez Canal Economic Zone, producing 200 000 tonnes annually from 2027

Policy

- No domestic SAF mandate yet

COUNTRY PROFILE

Nigeria



FEEDSTOCK

- Vegetable oils (palm, soybean)
- UCO
- Animal fats

UNIQUE ADVANTAGES

- Strategic Gulf of Guinea location
- Infrastructure with Dangote Petroleum Refinery with jet fuel refining capabilities. Minimal capital required; lowest risk, fastest deployment
- Abundance of vegetable oils

POTENTIAL PATHWAYS

- FT (gasification)
- AtJ
- HEFA co-processing

PROJECTS AND POLICY

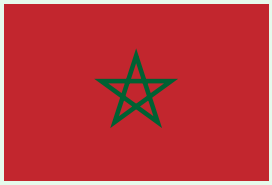
- Dangote refinery (operational 2024): exporting 120 000 tonnes of jet fuel to BP Refinery Rotterdam, Netherlands
- Co-processing capacity: 3 321–5 950 barrels per day SAF ready

Policy

- No domestic SAF mandate yet

COUNTRY PROFILE

Morocco



FEEDSTOCK

- Solar power (among MENA leaders)
- Agricultural residues (wheat, dates)
- MSW
- Green hydrogen projects

UNIQUE ADVANTAGES

- Strategic Europe–Africa bridge position
- Renewable solar and wind energy leadership
- Political stability
- Strong EU partnerships for green hydrogen corridors
- Phosphate industry CO_2 sources

POTENTIAL PATHWAYS

- PtL (e-SAF) (long term)
- HEFA
- Co-processing
- FT

PROJECTS AND POLICY

- Synhelion committed US$1 billion to Morocco's solar programme
- Engie and Morocco's OCP plan to develop large-scale green energy infrastructure
- Royal Air Maroc's first Morocco–Europe flight using SAF in February 2025

Policy

- No domestic SAF mandate yet

Sources: compiled from a variety of sources[39]

Obstacles and potential solutions to faster growth of SAF production in Africa

Lack of SAF market demand creation

With SAF mandates in their infancy in Africa, the push towards SAF production is being largely externally driven. This is starting to change as countries such as Kenya and Ethiopia develop more robust policy frameworks, and as airlines such as Kenya Airways and Ethiopian Airlines fund production projects with offtake agreements. The AU's SAF strategy contains the beginnings of demand creation, but it is modest and non-binding. A stronger continental framework could support national SAF mandates, which could also incorporate local content requirements, with international airlines required to refuel using domestically (or regionally) produced SAF.

High cost of capital

SAF projects on the continent often need to achieve higher prices to offset the so-called risk premium associated with financing larger production projects in Africa.[40] This is hampering investment. A stronger role for regional development banks could support the mobilisation of domestic capital to finance African SAF production. The African Development Bank is leading the way with its Integrated Aviation Transformation Program, which includes a strong emphasis on supporting SAF production, de-risking early projects and developing strategic partnerships for technology transfer.

Signing offtake agreements with major international airlines could also be a useful strategy, and EU ETS funds could also be valuable once deployed. World Bank modelling shows that using de-risking instruments to bring African risk profiles down to OECD levels could reduce the cost of locally produced SAF by 17–28%.[41]

Skills and technology

Ownership of the intellectual property of the chemical processes for SAF is held almost entirely by European, American and, increasingly Chinese, companies,[42] and there is limited existing technology-adjacent infrastructure (primarily refinery capacity) and related skills. This means that SAF projects in Africa risk technology dependency and must pay licencing costs to use technology and/or embark on joint ventures to develop SAF production. The exception to this is South Africa's Sasol. To counter this challenge, African governments can mandate technology and skills transfers, utilise local content requirements where appropriate and invest in research and development.

Export of feedstocks

European and US companies are currently aggressively sourcing SAF feedstocks such as UCO and other bio feedstocks for their own production needs. To counter this trend, Kenya has introduced stricter licencing on biofuel exporters, while South Africa is exploring making SAF a 'primary mitigation option' under its Carbon Tax Bill, which would effectively give companies a tax break for processing feedstocks locally. Egypt and Namibia require 20% of the value created by new green fuel contracts to be local. The AU's SAF strategy recommends that member states implement fiscal and non-fiscal incentives to prioritise local feedstock use.

Some of the policy tools that may be required to prevent the export of feedstocks may be open to challenge at the World Trade Organization (WTO). However, this should not deter policy-makers unduly, given the current impasse at the WTO; they should instead seek to adjust WTO rules to enable developmentally necessary green industrialisation policies.

Conclusion and policy recommendations

Global decarbonisation initiatives pose substantial challenges not only for Africa's aviation sector but also for economic development. These costs hit Africa disproportionately as its aviation sector is in a 'take-off' stage of development and its contribution to global aviation emissions is small. It will be important for African policy-makers to invest in a much more granular understanding of these risks and to ensure that their concerns are heard across the relevant policy processes.

Recommendations relating to international processes:

- Conduct a thorough impact assessment of the possible EU ETS extension on African airlines directly, and on wider economic development on the continent, focusing on vulnerable export sectors and tourism.
- Take active steps to avoid a double-burden situation by requesting CORSIA-style exemptions from any ETS extension, or that CORSIA participation be considered as an alternative to ETS implementation.
- Request that any resources resulting from an extension of the EU ETS to international flights be ear-marked for support to address the impacts of aviation decarbonisation on African countries.
- Continue to take strong and unified positions at ICAO, as well in representation to the EU.

While African countries have significant potential to develop competitive SAF production, only a robust and supportive policy framework will unlock this potential. The AU and its member states are beginning to build this framework. To strengthen and accelerate this process, African policy-makers could:

- Develop stronger continental and national SAF mandates incorporating local content provisions.
- Continue to ensure that regional development banks prioritise reducing the financing risk and costs of SAF production.
- Mandate technology and skills transfers as part of SAF production contracts and projects.
- Implement stronger measures (such as export bans or taxes) to counter the export of vital SAF feedstocks.
- Ensure that the measures required to develop SAF production (local content, export taxes, subsidies and technology transfer) are exempt from WTO challenge, for example by pursuing a development waiver.

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42 These include Topsoe (Denmark), Thyssenkrupp, Siemens Energy and INERATEC (German), Honeywell UOP, LanzaJet and Infinium (US).



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Beyond the rhetoric: What the EU and UK CBAMs mean for African countries

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Executive summary

Carbon emissions trade policies are reshaping global trade rules, and Africa is on the front line. The European Union's (EU) Carbon Border Adjustment Mechanism (CBAM), fully operational since January 2026, now requires importers to purchase certificates covering the embedded emissions of goods in six carbon-intensive sectors. The mechanism continues to evolve, with more detailed implementation rules recently adopted and planned extensions of its scope to downstream products and new emissions categories.

The United Kingdom, meanwhile, is launching its own CBAM in January 2027, with immediate financial obligations and no transitional phase. Unpacking these dynamics is critical for African countries seeking to navigate evolving requirements while advancing industrialisation and sustainable development objectives. This policy brief unpacks recent developments and how they may reshape countries' exposure to the EU and UK CBAMs, before examining the mechanisms' differentiated impact on African countries through granular, country- and sector-specific case studies spanning three time horizons.

In the short term, Morocco and Egypt illustrate how two major African fertiliser exporters face starkly different outcomes. Morocco is better positioned due to its low-carbon phosphate production, while Egypt, whose gas-intensive nitrogen sector has a significantly higher emission intensity per tonne, faces a more challenging outlook. In the medium term, the potential extension of the EU CBAM to indirect emissions would restructure competitive edges along energy lines. In this context, Mozambique's hydropower-based aluminium production would gain an advantage while Egypt and South Africa would face sharp cost escalations from their fossil-fuel-dominated grids. In the long term, the forward-looking cases of Guinea, Ghana and Namibia reveal that the EU CBAM can catalyse green industrialisation for countries with abundant renewable energy, provided that complementary capital, infrastructure and verification capacity are in place.

Taken together, these case studies show that the EU CBAM produces markedly uneven outcomes across the African continent, driven by differences in production methods, energy sources and institutional readiness. Five cross-cutting findings emerge. First, it is relative competitiveness, not trade exposure alone, that shapes a country's CBAM exposure and readiness. Second, that trajectory is not static, as evolving requirements and planned scope extensions will redraw exposure profiles. Third, building monitoring, reporting and verification capacity is a near-term priority but must be embedded within wider institutional and infrastructural development to be effective. Fourth, although the EU CBAM can incentivise green industrialisation, realising that potential depends on complementary finance, technology and energy infrastructure. Fifth, differentiated approaches are needed.

African countries could combine diplomatic engagement, the adoption of domestic carbon pricing and long-term decarbonisation strategies, while the EU tailors its support to African countries' specific exposure and vulnerability profiles.

Introduction

Efforts to implement environmental trade policies are accelerating. The European Union's (EU) Carbon Border Adjustment Mechanism (CBAM) is the first large-scale, multi-sector emissions policy of this kind, and it has been fully operational since 1 January 2026, combining both reporting and financial obligations. The mechanism continues to evolve, with new amendments currently undergoing the legislative process and implementation rules being adopted. These changes could significantly broaden the EU CBAM's reach, with implications for trading partners including African countries.

Meanwhile, the United Kingdom (UK) is finalising its own CBAM, expected to enter into force in January 2027. While inspired by similar objectives, the UK approach is expected to differ in key respects from the EU model. Both sides have formally launched negotiations to link their respective emissions trading systems, a process that, if completed, would trigger mutual CBAM exemptions between the two jurisdictions.

Deepening the awareness of carbon emissions trade policies in general and understanding these specific dynamics is critical for African countries to navigate the evolving requirements while advancing domestic and regional industrialisation and sustainable development. The impact of these policies on the continent is inherently uneven and will depend on variables that high-level macro-economic analysis may not comprehensively capture: the carbon intensity of production processes, the degree of EU and UK export market dependence, access to clean energy inputs, and institutional capacity to verify emissions. While some exporters face structural competitiveness pressures, others may gain a competitive advantage. Assessing the impact of EU and UK CBAMs therefore requires a more granular analysis based on country- and sector-specific data, taking into account how the mechanisms are currently designed, how they may evolve and the various factors mentioned above.

This policy brief first examines the evolving landscape of carbon pricing mechanisms and their implications for Africa, focusing primarily on the EU CBAM, given its more advanced state of design and implementation, and bringing the UK CBAM into the analysis where relevant. In doing so, this study seeks to unpack the differentiated outcomes through granular, country- and sector-specific analysis, drawing on available data and evidence.

The paper then looks at the key features and recent developments of both the EU and UK mechanisms, what African decision-makers need to know about how these systems work, where they are headed and how they compare. Thereafter is a review of existing analysis on the CBAMs' impacts on African countries, highlighting where the evidence falls short. A series of case studies follows, examining the effect of the EU CBAM and its evolving scope on specific countries and production sectors in Africa. The final section identifies strategic priorities for both African and EU states, including how countries can combine and sequence their responses to the EU CBAM, and what a more development-oriented EU engagement should look like in practice.

Unpacking recent developments

EU CBAM: What's changed?

The EU CBAM is a pillar of the EU's climate agenda and its Fit for 55 legislative package, designed to reduce the region's net greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels and to reach net zero emissions by 2050. The mechanism introduces a carbon price on selected imported goods, equivalent to the carbon price on EU-produced goods under the EU Emissions Trading System (ETS), a cap-and-trade system designed to lower emissions through a carbon market. In doing so, the mechanism seeks to level the playing field between domestic and imported producers, requiring EU importers to purchase CBAM certificates covering the difference between any carbon price already paid in the country of production and the prevailing EU ETS allowance price. The instrument thus aims to 'prevent the risk of carbon leakage, thereby reducing global carbon emissions and supporting the goals of the Paris Agreement'.[1]

Implementation timeline

After a two-year reporting-only transitional phase (October 2023 to December 2025), the mechanism entered its definitive phase on 1 January 2026. EU importers must now register as authorised EU CBAM declarants, submit annual declarations of verified embedded emissions, and purchase and surrender EU CBAM certificates. Certificate prices are pegged to EU ETS allowance prices, calculated as a quarterly average for 2026 imports and a weekly average from 2027 onwards. Importantly, the actual purchase and surrender of certificates for 2026 imports will not begin until February 2027, giving importers additional lead time.

Between 2026 and 2034, CBAM obligations are phased in proportionally to the reduction in ETS free allowances; by 2034, free allowances will be fully phased out, and the EU CBAM will be fully operational. While the legal obligation to purchase CBAM certificates rests with the importer, in practice, exporters are expected to bear most of the costs and compliance burden, as EU buyers will demand transparency of emission data and price adjustments.

What is covered

The EU CBAM currently covers six carbon-intensive sectors at high risk of carbon leakage: iron and steel, cement, aluminium, fertilisers, hydrogen, and electricity. It covers direct emissions (from production processes) across all sectors and, for cement and fertilisers, also covers indirect emissions (from electricity consumed in production).[2]

Key features relevant to African exporters

- **Default values**: where importers cannot report actual emissions, they may rely on default values. These values are set on a country- and product-specific basis, above estimated actual emission intensities, and carry progressive mark-ups – 10% in 2026, 20% in 2027, 30% from 2028 onwards; capped at 1% for fertilisers.[3] This makes investing in monitoring, reporting and verification (MRV) capacity essential for producers seeking to avoid escalating cost penalties (see Box 3).
- **Verification of actual emissions**: actual emissions must be verified by an accredited verifier. Non-EU companies may apply for accreditation to the national accreditation body of any EU member state. Emissions may also be verified by registering the installation in the EU's third-country installation framework.[4] [5]

- **Emissions calculation methodology**: the implementing rules for calculating embedded emissions in the definitive phase were finalised in December 2025, covering system boundaries, monitoring methodologies, attribution of emissions to goods and the use of actual versus default values.[6] Notably, for sectors where indirect emissions are covered (currently cement and fertilisers), the regulation sets the default emission factor for electricity consumed in production at the average of the country-of-origin's electricity grid, calculated as a five-year rolling average. This means that as a country adds renewable capacity, its grid emission factor falls and the CBAM liabilities on its covered exports decline accordingly. This is particularly significant for countries like Egypt, whose industrial sector relies heavily on gas-fired electricity and whose fertiliser exports are substantially exposed to the EU CBAM, but which is also actively investing in solar and wind capacity.
- **Carbon prices paid in a third country**: importers can deduct a carbon price 'effectively paid' in the country of origin and in any third country where the product was sourced from their CBAM certificate obligations.[7] An implementing act expected in 2026 will define the criteria for recognition, including how carbon credits under Article 6 of the Paris Agreement on climate change may be taken into account.[8] In practice, this is expected to offer limited near-term relief for most African exporters. South Africa remains the only African country to date with an implemented mandatory carbon pricing instrument. Elsewhere, carbon pricing remains voluntary or at an early design stage, with countries such as Côte d'Ivoire, Nigeria and Senegal starting to explore carbon pricing as part of their climate strategies.[9] Even South Africa's effective carbon tax rate remains far below EU ETS levels, limiting the deductible amount.[10] How the implementing act defines 'effectively paid' will therefore be a critical question for African governments to engage on.
- ***De minimis* exemption**: importers bringing in less than 50 metric tonnes per year of CBAM goods (cumulatively) are exempt from the mechanism. This new *de minimis* threshold replaces an earlier rule that exempted consignments valued at under EUR 150.[11] As a result, the European Commission estimates that this removes approximately 90% of importers (by number) from the scope while covering over 99% of embedded emissions. This threshold applies to only EU importers, not to third-country producers; that is, African small and medium enterprise exporters below the threshold are not directly exempt, although their EU buyers may be if they fall below the required level.

What has changed

In December 2025, the European Commission proposed extending the EU CBAM from January 2028 to cover approximately 180 additional downstream steel- and aluminium-intensive products. These products would include vehicle components, industrial machinery, fabricated metal goods and domestic appliances such as washing machines and refrigerators.[12] This proposal, pending legislative approval, could bring a significantly wider range of African exports into the CBAM's orbit (see Box 2). The commission has also signalled future reviews of indirect emission coverage for steel, aluminium and hydrogen by 2027, and potential expansion to other EU ETS sectors such as chemicals.[13]

Alongside the above changes, the commission proposed a Temporary Decarbonisation Fund (TDF), financed from part of the CBAM revenues, to partially reimburse EU producers of carbon-intensive export goods at risk of carbon leakage.[14] Indeed, the use of CBAM revenues has been among the most contested aspects of the mechanism, and the possibility of repurposing CBAM revenues to support decarbonisation in trading partners, particularly least-developed countries (LDCs), was considered during the legislative process. However, the adopted CBAM regulation directed the mechanism's revenues to the EU budget, with only a preambular statement of intent on support for LDCs.[15] [16] The TDF goes a step further by

directing a part of the CBAM's revenues explicitly to EU producers, possibly raising questions about the mechanism's compatibility with the World Trade Organization (WTO) rules, depending on how the fund is designed and implemented.[17]

UK CBAM: Similar direction, different design

The UK CBAM shares the EU's fundamental objective of addressing carbon leakage as free allowances under the UK ETS are phased down, but this mechanism differs from the EU model in some respects that have direct implications for African exporters. Table 1 summarises the key differences between the two mechanisms.

The UK CBAM will enter into force on 1 January 2027 – one year after the EU CBAM – covering aluminium, cement, fertilisers, hydrogen, and iron and steel (also covered by the EU's mechanism), with electricity excluded from its scope. Glass and ceramics were originally proposed for inclusion but were removed from the 2027 launch following stakeholder consultation. The mechanism's scope will be reviewed beyond 2027 and may expand to reflect new evidence related to carbon leakage risk, as well as methodological and technological advances.[18] When it comes into effect, the UK CBAM will cover only direct emissions across all sectors, with indirect emissions to be included at the earliest in 2029. The *de minimis* threshold also varies. For the UK, the threshold is set at GBP 50 000 of UK CBAM goods over a given time period, a value-based threshold that is structurally different from the EU's mass-based 50-tonne threshold.[19]

Most significantly, the UK CBAM includes no transitional reporting-only phase, and financial obligations apply from day one, with the first annual return and payment due by 31 May 2028. As a result, African exporters entering the UK market will face immediate compliance and cost exposure with no learning period built into the system. The mechanism also operates differently from the EU's. Rather than a certificate purchase-and-surrender system, the UK applies a tax, with sector-specific rates set quarterly, based on the prior quarter's UK ETS average auction price adjusted for free allocation levels.

One of the most consequential design differences for African exporters concerns default values. The EU publishes country- and product-specific defaults with progressive mark-ups, as discussed above. The UK, by contrast, will apply a single global-average default across all covered commodities, with no country differentiation.[20] This means that countries will be paying two possibly very different default values under the two schemes, impacting their exposure.[21] [22]

Table 1: The EU CBAM versus the UK CBAM – key design features

Feature	EU CBAM	UK CBAM
Entry into force	1 January 2026	1 January 2027
Transitional phase	Yes, October 2023–December 2025	No, charges from day one
Payment mechanism	Purchase and surrender of CBAM certificates linked to EU ETS price	Carbon levy or tax set by the government based on UK ETS price
Sectors covered	Cement, iron and steel, aluminium, fertilisers, hydrogen, electricity	Aluminium, cement, fertilisers, hydrogen, iron and steel (no electricity; glass and ceramics are deferred)
Downstream expansion	About 180 products proposed from January 2028 (pending adoption)	No equivalent announced
Direct emissions (scope 1)	Covered for all sectors	Covered for all sectors
Indirect emissions (scope 2)	Cement and fertilisers covered from 2026; steel, aluminium and hydrogen are excluded (subject to review in 2027)	Currently excluded. Decision deferred to 2029 at earliest for all sectors
Default values	Country- and product-specific, with progressive annual mark-ups	Single global average per Combined Nomenclature code; no country differentiation
Carbon price deduction	Yes, methodology under development	Yes, methodology under development
De minimis threshold	50 tonnes per year cumulative (mass-based)	GBP 50 000 over given time frame (value-based)

Source: authors' analysis

EU–UK ETS linkage negotiations

The EU and the UK currently each have their own emissions trading systems (ETS). At the May 2025 EU–UK Summit, the two regimes committed to working towards linking the UK ETS to the EU ETS as part of a broader strategic partnership, with formal negotiations starting in January 2026.[23] In the meantime, African exporters to both markets will have to navigate and comply with two systems with varying scopes.[24] [25]

Should the link be achieved, it would be consequential for the two CBAMs. The ETS linkage would trigger mutual CBAM exemptions, meaning that, once in force, the EU CBAM would no longer apply to goods originating in the UK, and the UK CBAM would no longer apply to EU-origin goods. Both mechanisms are, however, expected to continue to apply to third-country exporters, including those from Africa. It is unclear precisely how the two CBAMs will interact in practice, even after the ETS linkage, which is expected to minimise scope and methodological differences between the two regimes.[26]

For instance, on the cost of carbon, the UK ETS price has consistently traded at a significant discount to the EU ETS's since 2023. Linking the two systems would likely drive UK ETS prices up towards EU levels, which in turn would increase the effective CBAM cost burden on third-country exporters.[27] Given the many uncertainties in this area, African governments and exporters should monitor this process closely.

Impact of the EU CBAM on African countries: What existing analysis tells us

The impact of carbon emissions trade policies on Africa, and on developing countries more broadly, has attracted considerable attention, particularly since the adoption of the EU CBAM. Studies ranging from macro-level modelling exercises to dedicated exposure databases all highlight a shared concern: that the CBAMs may shift a disproportionate share of the economic burden to non-EU (and non-UK) countries, including some of Africa's most vulnerable economies.[28] The EU CBAM has been the primary focus of this literature; analysis of the UK CBAM remains comparatively under-developed, and unlike the European Commission, the UK government has not published an assessment of its mechanism's likely effects on third countries.[29] [30]

A useful starting point to measure the impact of the EU CBAM on Africa is the scale of the continent's trade in CBAM goods with the EU. The EU is Africa's most important export partner, accounting for around 28% of the continent's total exports in the years preceding the introduction of the EU CBAM. According to a 2023 analysis by the African Climate Foundation and the London School of Economics, the EU accounted for approximately 26% of Africa's fertiliser exports, 16% of iron and steel exports, and 12% each of aluminium and cement exports.

These figures make CBAM goods a meaningful component of the continent's trade with its primary market. At the same time, African industrial production of most CBAM goods is, on average, more carbon-intensive per dollar of output than that of competing exporters, meaning that the effective CBAM price is expected to fall harder on African producers. [31]

Yet the country-level picture is considerably more differentiated, with outcomes diverging sharply depending on production profiles and energy sources. For instance, the World Bank's CBAM Trade Exposure Index finds that Mozambique records the highest trade exposure score globally in aluminium, while Ghana registers a negative score, indicating below-EU emission intensity and potential competitive gains rather than losses.[32] [33] Moreover, Sandbag's CBAM Simulator, another interactive modelling tool, estimates gross CBAM fees for African exporters at around EUR 1.5 billion annually, but calculates net costs of approximately EUR 670 million once higher EU selling prices (resulting from the phaseout of free ETS allowances) are factored in.[34] [35]

Countries with low-carbon production profiles, such as Namibia and Ghana, could, in principle, generate a net financial benefit from CBAM as rising EU market prices outweigh their modest fee liabilities. This, however, will depend on whether emerging green hydrogen and green steel projects overcome significant financing, infrastructure and implementation hurdles to reach production at scale.

The European Commission's CBAM review report, which takes stock of how the mechanism has worked during the transitional period, offers a complementary picture.[36] It assesses the mechanism's impact on developing countries through two lenses: trade exposure, determined by a country's export dependence on CBAM goods to the EU; and emission intensity, determined by embedded carbon content in exports. Based on these factors, the report finds that countries and sectors with lower emission intensity are expected to see increased demand, while products with relatively high emission intensity are expected to see reduced demand.[37]

The headline finding is that the aggregate impact on the gross domestic product (GDP) of LDCs is negligible, below 0.01% by 2035, with similarly limited effects for other developing countries and trading partners in the EU's neighbourhood. The European Commission attributes this to the CBAM's sectoral focus. The mechanism targets energy- and emissions-intensive industries, which are primarily found in more industrialised economies, while most LDCs export only small volumes of CBAM-covered goods to the EU.

However, aggregate quantitative CBAM databases have several analytical limitations. For example, the commission aggregates most African countries outside the immediate neighbourhood (except for Mozambique) into a broad 'other developing countries and emerging economies' category, meaning that granular impacts for much of Africa are not captured. Second, most quantitative analyses operate at country and broad sectoral levels, missing sub-sectoral and firm-level impacts and differences in exposure between firms. They also do not account for compliance costs and MRV burdens.

Finally, much of the existing analysis reflects the EU CBAM's current scope, and was conducted before more detailed implementation rules were finalised. As the mechanism evolves, the picture is likely to shift considerably. These limitations underscore the need for more granular, country- and sector-specific analysis, which the following section provides.

Deep dives: Differentiated impacts across countries and sectors

Understanding the EU CBAM's differentiated impact on African countries requires looking beyond aggregate or trade exposure metrics. Other factors shape a country's CBAM exposure and trajectory, including its competitive edge in low-carbon production, its access to renewable energy at scale and its ability to engage in MRV.

The following case studies examine these dynamics across three time horizons: (a) short-term impacts under the current EU CBAM scope; (b) medium-term shifts as the mechanism's scope is expected to expand; and (c) long-term implications for countries with nascent industries for whom the central question is whether the EU CBAM will facilitate or constrain their industrial development.

Where relevant, the UK CBAM is brought into the analysis, particularly where design differences could produce meaningfully different outcomes for African exporters.

Short term: Asymmetric exposure of African fertiliser producers – Morocco versus Egypt

Fertilisers are among the continent's most trade-exposed CBAM sectors, with the EU accounting for around 26% of Africa's total fertiliser exports (as of 2023).[38] The sector has also become a rising source of political tension in the EU, where geopolitical concerns and rising input costs for farmers have prompted a series of policy responses that could impact fertiliser exporters' CBAM exposure (see Box 1).

A closer look at Morocco and Egypt, two major African exporters to the EU, illustrates how the EU CBAM can produce significantly different impacts. Together, Morocco and Egypt represent the continent's two largest CBAM exporters by absolute value (EUR 1.6 billion and EUR 1.0 billion, respectively, in 2024), both of which are significantly exposed through their fertiliser sectors.[39] However, their production profiles point in opposite directions.

Morocco's fertiliser exports are predominantly phosphate based, a production process that requires a limited amount of nitrogen and thus carries a relatively low emission intensity.[40] [41] The country's fertiliser industry is dominated by the Office Chérifien des Phosphates Group (OCP), a state-controlled company controlling over 70% of the world's known phosphate reserves.[42] Since Morocco lacks natural gas reserves, OCP has historically depended on imported grey ammonia, a vulnerability it is now converting into an advantage.

In 2023, OCP announced a US$7 billion investment into on-site green ammonia production near Tarfaya, powered by 3.8 gigawatts (GW) of dedicated wind and solar energy, with production targeted for 2027.[43]

Once operational, this would further reduce the carbon content of Morocco's nitrogen-containing products, widening the competitive gap with gas-dependent producers as CBAM obligations phase in. The country's broader renewable energy strategy, including a target of 52% renewable capacity by 2030, further reinforces this positioning.[44]

Egypt's fertiliser sector, by contrast, produces predominantly nitrogen-based products (urea and ammonium nitrate) through steam methane reforming, a process that is gas intensive both as feedstock and as fuel, resulting in significantly higher emission intensity per tonne. While there are several fertiliser producers in Egypt, production is dominated by four large, predominantly state-owned enterprises – Misr Fertilizers Production Company (MOPCO), Abu Qir Fertilizers, Egyptian Chemical Industries Company (Kima) and El-Nasr for Fertilizers & Chemical Industries Co. (SEMADCO).

All of these companies operate gas-fired nitrogen plants, although emissions profiles vary between firms. Egypt is pursuing mitigation efforts, including green ammonia projects and the National Low-Carbon Hydrogen Strategy launched in 2024. However, with renewables accounting for under 12% of the electricity mix, the structural challenge remains significant (as examined further below in the cases of Egypt and South Africa).

These contrasting production profiles are reflected in the European Commission's own modelling, which projects increased Moroccan fertiliser output relative to the baseline under the EU CBAM. Meanwhile, Egyptian output (as well as Algerian, another carbon-intensive fertiliser producer in Africa) is projected to decline.[45]

Box 1: Overview of recent EU developments on fertilisers

The inclusion of fertiliser in the EU CBAM's scope has become one of the most politically sensitive aspects of the mechanism, given fertilisers' strategic importance as an input for EU agriculture. Recent EU-level developments reflect this tension and could impact the near-term outlook for fertiliser exporters.

Under the CBAM, fertilisers are the only commodity to be subject to a lower default value mark-up, capped at 1% across all years (instead of 10% with a progressive increase to 30% for all other sectors). Most significantly, the legislative proposal to amend the CBAM regulation proposes the introduction of an 'emergency brake' that would empower the European Commission to temporarily exclude goods from the CBAM's scope in case of 'severe harm to the Union internal market due to serious and unforeseen circumstances related to the impact on the prices of goods'.[46] The provision, if approved,

could be applied retroactively from 1 January 2026.[47] While current discussions centre on its potential activation for fertilisers, the clause could in the future be triggered for any CBAM-covered sector, with implications for African exporters beyond fertilisers.

In February 2026, the commission proposed to suspend most-favoured-nation (MFN) tariffs on nitrogen fertiliser imports and inputs for their production (ammonia and urea) through duty-free tariff rate quotas for one year, applicable to all countries except Russia and Belarus. The measure is designed to lower input costs for EU farmers, with an estimated EUR 60 million in duty savings, while reducing dependency on Russian and Belarusian supply.[48] Top African fertiliser exporters, such as Algeria and Egypt in particular, which are both major urea exporters (7 million tonnes exported in 2024), already have duty-free access to the EU, and several sub-Saharan African countries have equivalent access through unilateral preference schemes. The measure could, however, indirectly affect their competitive position, as other major producers, particularly in the Gulf and the Americas, which currently paying the standard 6.5% MFN duty, would gain more price-competitive temporary access to the EU market.[49]

Medium term: Potential impacts as the EU CBAM evolves

As the EU CBAM develops and its scope expands, countries' risk profiles will shift. Two developments are particularly consequential for African exporters in the medium term. The first is the proposed extension to additional downstream products from 2028, which could significantly broaden the range of African exports that fall within the CBAM's scope (see Box 2).

The second is the mechanism's anticipated review in 2027, which will assess whether to extend the CBAM to cover indirect emissions for the remaining sectors that are currently exempt from the mechanism (aluminium, iron and steel, and hydrogen).[50] [51] If indirect emissions are brought into scope, the carbon intensity of a country's electricity grid would become a key determinant of export competitiveness.

This is particularly critical given that for energy-intensive products like primary aluminium, where indirect emissions can vastly exceed direct emissions at manufacturing plants (e.g. by up to 10 times in the case of coal-powered smelters), the electricity source is the largest variable in total carbon footprint.[52] Early estimates suggest that including indirect emissions could increase CBAM liabilities for aluminium imports by several-fold on average, with significantly higher impacts (up to ninefold) for exports from coal-intensive grids such as South Africa and China.[53] [54] Conversely, countries powered by hydropower or other clean energy sources would see their competitive position strengthen considerably. The following three cases illustrate this divergence.

Box 2: Proposed downstream extension of the EU CBAM to steel- and aluminium-intensive products

A key development that could significantly alter the CBAM exposure of African countries in the medium term is the proposed extension of the mechanism to downstream products. If approved, this will add around 180 steel- and aluminium-intensive products to the CBAM scope, with implementation from 1 January 2028. The extension would cover primarily intermediate industrial goods such as car parts, domestic appliances and agricultural machinery.[55]

The extent of the impact on African countries will depend on various factors such as the final list of goods included, bilateral trade flows at the product code level and the carbon intensity of production in exporting countries. For instance, South Africa and Morocco could face increased exposure given their established automotive sectors and integration into European value chains.[56] Crucially, any impact on their automotive sectors would hinge on whether African countries export specific components or other goods covered by the extension, rather than finished passenger cars, which will remain excluded from scope.[57]

One preliminary estimate suggests that the proposed extension could bring in an additional US$3 billion in South African CBAM exports to the EU, with the automotive value chain accounting for the vast majority. As a result, around 30% of South Africa's total exports to the EU could potentially fall within CBAM's extended scope.[58] While these figures are indicative and will depend on the final scope adopted, they illustrate how a country's CBAM exposure may shift substantially as the mechanism evolves across emissions categories, products and, potentially, new sectors.

Mozambique: Hydropower as a latent competitive edge

Aluminium accounts for approximately 30% of Mozambique's total official exports, with 97% of its aluminium production destined to the EU, making it one of the most EU-dependent CBAM exporters globally.[59] According to the European Commission's CBAM review report, Mozambique is 'unique among the countries assessed',

given that nearly all of its CBAM exports come from one product (unwrought aluminium) produced by one company, the Mozal Aluminium smelter near Maputo.

In terms of trade exposure, the commission's report identifies Mozambique as significantly more exposed to the mechanism than other LDCs, with CBAM-covered exports to the EU reaching EUR 1.2 billion in 2024, equivalent to approximately 5.5% of its GDP. By comparison, the next most-exposed LDCs (Cambodia and Zambia) exported only EUR 14 million and EUR 15 million in CBAM goods to the EU, respectively.[60]

At the same time, Mozambique is among the cleanest non-EU-country producers, with an emission intensity only 1.04 times that of the EU average, as per commission estimates. This results in a projected 0.4% decline in sectoral output and an almost negligible GDP impact (−0.01%) by 2035.[61] A study using plant-level data from 153 smelters confirms that Mozal Aluminium can be cost competitive under the CBAM when actual emissions are credited.[62] The World Bank's CBAM Trade Exposure Index supports this position. While the country has the highest trade exposure for aluminium, its clean energy base means the actual cost burden may be lower than aggregate metrics suggest, if actual emissions are verified.

This position could be strengthened further if the EU CBAM is extended to indirect emissions. Because Mozal Aluminium's electricity is sourced from hydropower, its indirect emission factor is near zero, a significant advantage in a sector where, as noted above, indirect emissions can vastly exceed direct emissions for fossil-fuel-powered competitors. Plans to expand clean power capacity, such as the planned 1 500 megawatt (MW) Mphanda Nkuwa hydroelectric project, could provide the country with a further competitive edge.[63] However, realising this potential depends on the ability to report and verify actual emissions rather than relying on default values, showcasing the importance of investing in building MRV capacity (see Box 3).

Mozal Aluminium, Mozambique's only aluminium smelter and the country's source of CBAM-covered exports to the EU, was placed under care and maintenance in March 2026, due to the inability to secure competitively priced electricity, leaving the plant's future uncertain.[64] The case nonetheless remains analytically relevant, as it illustrates how access to clean energy can play a critical role in whether a country can translate a low-emission production profile into a competitive advantage under the EU CBAM.

Box 3: Developing MRV capacity or facing punitive default values

Default values are set on a country- and product-specific basis, determined by either: (a) the average emission intensity of the exporting country plus mark-ups; or (b) where reliable data is unavailable, the average of the 10 highest-emitting exporting countries. Mark-ups rise from 10% in 2026 to 30% from 2028 onwards (capped at 1% for fertilisers), deliberately making reliance on defaults increasingly costly.[65] Reporting verified actual emissions is essential to avoid this penalty, and thus investing in MRV capacity and local accreditation is a priority for the African continent.[66] Without it, African producers with low-carbon profiles face a structural disadvantage, assessed at default values that obscure their competitive edge and translate directly into higher CBAM obligations, irrespective of their actual carbon footprint.

African countries are broadly estimated to lack well-established systems for monitoring and measuring carbon content at the installation level. However, some progress is underway. Mozambique and Zambia have started developing MRV roadmaps with EU support, with Morocco among the most institutionally advanced on the continent.[67] Even where producers can measure actual emissions, this data must be independently verified by an accredited verifier. While the EU CBAM framework allows third-country verifiers, they must be accredited by an EU member state's national accreditation body. Unless such capacity is developed in Africa, producers will have to engage European or international firms, adding significant cost, particularly given the mandatory physical site visits to production installations.[68]

Egypt and South Africa: Fossil fuel grids as structural liabilities

Egypt and South Africa illustrate a more challenging dynamic. Both countries are significant exporters of CBAM-covered goods, but their fossil-dominated electricity grids mean that extending the EU CBAM to indirect emissions could substantially increase their cost exposure.

On the one hand, Egypt is one of the EU's three largest neighbourhood-country exporters of CBAM goods (EUR 1.6 billion in 2024, ~0.4% of GDP),[69] with iron and steel, aluminum, and fertilisers as key impacted sectors.[70] Egypt's electricity mix, approximately 88% fossil fuels, with a grid intensity nearly twice the EU average (at ~446 gCO_2eq/kWh),[71] means that extending indirect emissions to metals would sharply increase liabilities.[72]

The steel sector illustrates this risk. Egypt's dominant steelmaking production route, electric arc furnace with direct reduced iron, is substantially more electricity intensive than other routes, such as blast furnace steelmaking (500–650 kWh/t versus 200–300 kWh/t).[73] This makes it particularly exposed to any extension of the CBAM to indirect emissions, given Egypt's fossil-fuel-dominated grid.[74] For aluminum, exposure is even more acute. Smelting consumes about 15 000–17 000 kWh/t, implying roughly 6.7–7.6 tCO_2[75] in indirect emissions per tonne, with projections pointing to about 500% increase in CBAM costs.[76] [77]

Egypt is investing in mitigation strategies. For instance, Egyptalum has signed a cooperation agreement with Norway's Scatec ASA to develop a 1 GW solar project near Nag Hammadi. The project will be in two 500 MW phases, with 200 MW of storage (~US$650 million), and explicitly framed as a CBAM response aiming to cut emissions by up to 30%.[78] The GREGY interconnector – a planned 3 000 MW high-voltage direct current cable between Egypt and Greece, consisting of a flagship project under the EU's Global Gateway initiative – would enable large-scale renewable electricity exchanges and help decarbonise Egypt's industrial base.[79] However, with renewables accounting for only 11–12% of Egypt's electricity mix, against a 2030 target of 42%, the gap between ambition and delivery remains wide.[80]

On the other hand, South Africa is the largest African exporter of CBAM-covered goods to the EU by volume, with exposure spread across iron and steel, aluminium, and, to a lesser extent, fertilisers. According to the country's Presidential Climate Commission estimates, South Africa's CBAM-covered exports totalled approximately EUR 1.1 billion in 2023, representing around 5% of the country's total exports to the EU.[81]

A key factor shaping South Africa's CBAM exposure is its electricity grid. Studies show that the country's iron, steel and aluminium industries are inadequately prepared, with carbon intensity far exceeding that of other metal-exporting countries such as India, Russia and China. With a grid emission factor of 0.942 tCO_2e/MWh[82] (~85% coal), this is a fundamental structural condition affecting virtually every industrial product.[83] South32's Hillside Aluminium smelter in Richards Bay exemplifies the challenge. The smelter, powered by Eskom's coal grid, has a carbon intensity of approximately 18 tCO_2e/t,[84] compared to 4–6 tCO_2e/t for hydro-powered competitors.[85] Extending indirect emissions to aluminum would make this gap a direct cost differential, potentially pricing South African aluminum out of the EU market.

The three case studies above reveal that indirect emissions expansion would restructure competitive advantages. A common constraint concerns the countries' ability to verify actual emissions, given that without actual emissions reporting and verification, clean producers risk being assessed at default values that do not capture their performance (as explained in Box 3).

The divergence between the EU and the UK's CBAM regimes creates a further strategic consideration. The UK has delayed coverage of indirect emissions until at least 2029, meaning that for coal- or gas-grid-dependent producers, such as those in South Africa and Egypt, the UK market would likely carry significantly

lower carbon border costs for electricity-intensive goods. For lower-carbon producers like Mozambique, the reverse logic applies, and the EU market would be more attractive precisely because it would recognise their low-carbon electricity advantage.

This regulatory asymmetry could, in principle, drive trade diversion, with high-grid-intensity exporters gravitating towards the UK and low-intensity producers towards the EU. Perhaps even towards alternative markets altogether, including the United States and intra-African trade under the African Continental Free Trade Area (AfCFTA). The extent to which this materialises will depend on whether the EU extends indirect emissions coverage to remaining sectors, and whether the EU and the UK move towards linking their emissions trading systems.

Long term: How the EU CBAM could shape future industrialisation pathways

While the EU CBAM is predominantly analysed as a barrier affecting current exporters, it also serves as a forward-looking market signal that could shape future industrialisation pathways. Countries with abundant renewable energy could, over time, expand the production of low-carbon industrial goods that enter the EU and other export markets at a competitive advantage. This is one of the ambitions behind initiatives such as the Africa Green Industrialisation Initiative and the green hydrogen strategies across the continent.

This section examines three countries with limited or no current CBAM-covered exports – Guinea, Ghana and Namibia, for whom the central question is the extent to which the EU CBAM could facilitate or constrain future industrialisation pathways. The analysis is, therefore, exploratory and forward-looking. Furthermore, the CBAM is only one factor among many; domestic governance, access to capital, infrastructure and commodity prices all play larger roles.

Guinea and Ghana: Moving up the aluminium value chain

Guinea and Ghana illustrate how the EU CBAM interacts with African countries' ambitions to move up the value chain. Both countries have made integrated aluminium development a core industrial priority, but they sit at different stages and face distinct constraints.

Guinea holds approximately one-quarter of global bauxite reserves and is the world's largest bauxite ore exporter, with production reaching 146 million tonnes (Mt) in 2024.[86] While the country sits atop the world's largest bauxite deposits, it captures little downstream value due to limited refining and smelting capacity. Guinea's only operational alumina refinery, Friguia Bauxite and Alumina Complex (owned by the Russian company RUSAL) accounts for less than 3% of annual output, and it produces no primary aluminium.[87]

The military government has made moving up the aluminium value chain a core priority, pursuing a 'mine here, refine here' strategy that requires foreign mining concessions to include downstream refining plans, with several companies seeing their mining licences revoked over failures to invest in refineries.[88] Several alumina projects are now in the pipeline, the most advanced being the Chinese SPIC refinery at Boffa (1.2 Mt per year, targeting late 2027), although execution risks remain considerable.[89]

A key constraint in this regard is energy, as Guinea's energy grid remains inadequate for smelting-scale demand, with grid losses reaching 40% and most mining sites relying on diesel generators.[90] However, the country has substantial untapped hydropower potential at the headwaters of the Niger, Senegal and The Gambia rivers, and its updated Nationally Determined Contribution under the Paris Agreement targets 80% of electricity from renewables by 2030.[91]

Since raw bauxite and alumina fall outside the current scope of both the EU and the UK's CBAMs, Guinea's exposure is therefore entirely prospective. If Guinea succeeds in building refining and smelting capacity, the carbon intensity of the energy source will determine whether its aluminium faces high CBAM costs or is well placed to enter key export markets competitively.

Ghana, in turn, is further along the aluminium value chain but operating well below its potential. The Ghana Integrated Aluminium Development Corporation (GIADEC), established in 2018, was mandated to develop a globally competitive integrated aluminium industry spanning bauxite mining, alumina refining and smelting.[92] GIADEC's master plan envisions expanding the Awaso mine and opening new concessions at Nyinahin and Kyebi, building two alumina refineries (4–6 Mt per year), and expanding smelting capacity to 300 000 tonnes per year. In 2024, a ban on raw bauxite exports was introduced and expanded in February 2025 by the newly instated President John Mahama, declaring that by 2030, no raw mineral ore would leave Ghana unprocessed.[93]

The centrepiece in this strategy is the Volta Aluminium Company (VALCO) smelter in Tema, drawing electricity from the Akosombo hydroelectric dam, built in 1965 specifically for aluminium smelting. VALCO has operated at roughly 20–25% of its 200 000 tonnes per year nameplate capacity since 2011, with obsolete 1960s technology. Modernisation would require an estimated US$600 million, with the government pursuing strategic foreign investors.[94]

Unlike Guinea, Ghana already has a measurable and favourable CBAM position. The EU is already a significant trade partner, including for aluminium exports.[95] According to the World Bank's CBAM Trade Exposure Index, Ghana has lower emission intensity than the average EU aluminium producer, yielding a negative relative exposure score (−0.1% to −0.3%), an advantage derived from the country's hydropower base.[96] Moreover, Sandbag analysis estimates that, at current volumes, Ghanaian aluminium exported to the EU (~EUR 81 million in 2023) would face CBAM fees of about EUR 117 per tonne but possibly benefit from EU price increases of approximately EUR 142 per tonne, yielding a net gain. If the EU CBAM extends to indirect emissions, the calculus shifts further in Ghana's favour, with expected net gains of EUR 297 per tonne.[97]

The key question is whether VALCO can be revitalised within an appropriate time frame to capitalise on CBAM premiums. Obstacles include unreliable electricity, the capital required for modernisation, and the need for MRV infrastructure and access to accredited verifiers to ensure that producers can demonstrate actual rather than default emission values, without which Ghana's low-carbon competitive edge would be obscured.

Namibia: Green iron as an emerging export sector

Namibia represents the most forward-looking case. While the country currently has negligible CBAM exposure, its industrial strategy, designed around green hydrogen, green ammonia and green iron, could make it a major net beneficiary of the mechanism.[98] [99]

Namibia's strategy rests on an exceptional renewable energy endowment, with solar irradiance of 2 200–2 400 kWh/m²/year[100] (among the world's highest), wind speeds exceeding 7 m/s[101] along the southern coast, and globally unusual co-location of wind and solar resources enabling high electrolyser utilisation.[102] In 2022, the government launched the national Green Hydrogen and Derivatives Strategy with a dedicated council under the Office of the President. In the same year, Namibia became the first African country to enter into a strategic partnership with the EU on sustainable raw materials and renewable hydrogen, a cooperation since supported through the Global Gateway initiative.[103]

Two flagship projects anchor this cooperation. The first, the Hyphen Hydrogen Energy facility, is a large-scale green ammonia venture that envisions, at full scale, 7 GW of renewable energy capacity, 3 GW of electrolysers and nearly 2 Mt per year of green ammonia for export.[104] The second, the HyIron Oshivela Project, focuses on green direct reduced iron (DRI). Inaugurated in 2025 as Africa's first zero-emissions iron plant, it has a production capacity of 15 000 tonnes of green DRI per year (avoiding 1.8 tonnes CO_2 per tonne versus conventional processes). The plant has an off-take agreement signed with a major German steel manufacturer and phase 2 targeting 200 000 tonnes per year.[105]

Sandbag's modelling finds significantly positive outcomes. For hydrogen and ammonia produced via renewable electrolysis, CBAM liabilities are near zero because the process generates no direct combustion emissions, while the CBAM drives up EU market prices by displacing carbon-intensive competitors. In aggregate terms across Hyphen Hydrogen Energy and the HyIron Oshivela Project (both at full scale), projected CBAM fees total about EUR 26 million against revenue increases of EUR 287–322 million, a net annual benefit exceeding EUR 260 million.[106]

Significant risks qualify this outlook. Hyphen is years behind schedule, a major investor has withdrawn from one pipeline project and a change in political leadership has raised questions about the level of government commitment to the green hydrogen programme. Civil society concerns about asymmetric benefit-sharing – the risk that Namibia's natural resources power Europe's green transition while most Namibians lack reliable electricity – merit serious attention.[107]

Together, these three cases offer a more nuanced picture of the EU CBAM's potential impact on African industrialisation. The common thread is that CBAM rewards decarbonised production, and African countries with abundant renewables are theoretically well positioned. But without the capital, infrastructure and MRV systems to realise that potential, these advantages will remain prospective. Whether complementary mechanisms can close this gap is the decisive question.

Key takeaways

Mapping the EU CBAM's likely effects on Africa is, as the above analysis has shown, an exercise that yields different answers depending on what is measured, at what level of aggregation and the mechanism's scope. The case studies examined reveal several cross-cutting findings that highlight the differentiated impact of the CBAM on Africa, suggesting a more heterogeneous picture with varying risks and opportunities. What follows are the principal insights that emerge from this analysis.

Relative competitiveness determines CBAM outcomes

Aggregate trade exposure metrics, while useful for identifying which countries and sectors fall within the CBAM's scope, can be misleading as indicators of actual impact. The EU CBAM operates through relative competitiveness shaped by a range of factors. Morocco and Egypt both export significant volumes of CBAM-covered fertilisers to the EU, yet the European Commission's own modelling projects output gains for Morocco and output declines for Egypt, driven entirely by differences in production processes and carbon footprints, rather than trade volumes alone.[108] Mozambique registers the highest trade exposure index globally in aluminium, but its relatively low-carbon production yields emission intensities only marginally above the EU average. Ghana's negative trade exposure index in aluminium points to potential competitive gains.[109]

Competitiveness is a moving target

Moreover, CBAM exposure is not static. Factors such as the proposed downstream extension to additional steel- and aluminium-intensive products from 2028, and the potential inclusion of indirect emissions to be assessed in 2027, could fundamentally restructure competitive profiles. As the case studies in this paper illustrate, for energy-intensive sectors like aluminium, adding indirect emissions to the EU CBAM would make the carbon intensity of a country's electricity grid a key factor influencing export competitiveness. Countries should plan for the CBAM as it evolves, including by building capacity to monitor both direct and indirect emissions in anticipation of scope expansion.[110]

Developing MRV capacity is a critical near-term priority

A common constraint that runs through the case studies analysis is the ability to verify actual emissions. Without robust MRV infrastructure, even clean producers must rely on default values that do not reflect their actual carbon performance. For countries like Mozambique and Ghana, whose low-carbon production profiles should confer a competitive advantage, default values actively obscure that edge. MRV capacity-building, including the accreditation of African-based verifiers, training in emissions accounting covering both direct and indirect emissions, and the establishment of domestic monitoring systems, is among the most important near-term enablers for ensuring that the EU CBAM rewards genuine decarbonisation. However, MRV alone is not sufficient. It must be embedded within broader efforts to secure affordable clean energy, mobilise investment and strengthen institutional capacity.

CBAM can catalyse green industrialisation, but countries' exposure must be assessed and complementary support mobilised

For countries with nascent industries, the EU CBAM functions as a forward-looking market signal. The cases of Namibia and Ghana illustrate that countries with abundant renewable energy endowments are, in principle, well positioned to produce CBAM-competitive green goods. However, the CBAM does not provide the capital, infrastructure, energy governance or MRV systems required to realise these advantages. Namibia's Hyphen project is years behind schedule; Guinea lacks the clean energy infrastructure to move up the aluminium value chain; Mozambique's Mozal smelter was placed on care and maintenance, due to energy pricing failures, rather than emissions intensity. Green hydrogen projects in developing countries also face significantly higher capital costs than in Europe, which can offset the comparative advantage from superior renewable resources.[111]

The heterogeneity of these outcomes underscores the importance of conducting country-specific CBAM impact assessments, as the authors have argued in previous work for Europe Jacques Delors.[112] Such assessments should go beyond measuring trade exposure to encompass vulnerability dimensions, the carbon intensity of the energy mix, the availability of decarbonisation pathways, MRV readiness and institutional capacity. They should cover not only the current product scope but also anticipated expansions, as well as how the EU CBAM interacts with emerging environmental trade policies in other jurisdictions such as the UK.

Critically, such assessments should not be treated as a standalone exercise but embedded within a country's broader industrial strategy, export promotion plan and climate policy, informing cost-benefit analyses of different response options and their trade offs. While producing countries should lead these assessments, the EU could provide the technical and financial support necessary and use the findings to calibrate its own engagement and support measures.

Africa should adopt a unified but strategically differentiated approach

Countries can combine and sequence strategies to adapt to and prepare for the EU CBAM – building coalitions and engaging diplomatically in the short term, developing domestic carbon pricing instruments in the medium term, and investing in long-term decarbonisation and green industrialisation pathways.[111] The case studies illustrate different strategic positionings along this spectrum. South Africa's carbon tax, while currently far below EU ETS levels, provides a foundation for retaining carbon revenues domestically, if calibrated. Morocco's OCP investments represent large-scale industrial decarbonisation already underway. Namibia's green hydrogen strategy is a forward-looking alignment of industrial policy with the EU CBAM. However, the room for manoeuvre is unevenly distributed, and low-income and late-industrialising economies face the most constrained choices, reinforcing the need for tailored approaches.[113] [114]

At the same time, this differentiated approach does not exclude the possibility that African countries should pursue a coordinated continental approach, through the AfCFTA or the African Union. The approach should present shared positions on cross-cutting issues such as MRV capacity, the earmarking of CBAM revenues and appropriate treatment of LDCs, while allowing for strategically differentiated country-level engagement.[115]

Move beyond one-size-fits-all measures and tailor EU technical and financial assistance to countries' CBAM exposure and domestic contexts

On the EU side, differentiated engagement is equally warranted. As previously argued by the authors, countries with high exposure and high vulnerability should be priority recipients of both technical and financial assistance. For countries with high exposure but lower vulnerability, technical assistance for MRV would be particularly important. Countries with low exposure but high vulnerability (most LDCs and countries with emerging industries such as Guinea) require broader green development support to ensure that they are not left behind in the green transition and can advance domestic green industrialisation objectives.

Conclusion

As this policy brief has shown through detailed case studies spanning fertilisers, aluminium, iron and steel, and green hydrogen across a range of African economies, the EU CBAM's impact is fundamentally shaped by country-specific factors, the carbon intensity of national energy mixes, the structure of export portfolios, the availability of decarbonisation pathways, and, critically, the capacity to verify and report actual emissions. For some countries, notably those with abundant renewable energy endowments and low-carbon production profiles, the mechanism can create genuine opportunities for competitive positioning in an increasingly carbon-conscious global market. For others, particularly those locked into fossil-fuel-intensive energy systems and lacking the institutional infrastructure to demonstrate their actual carbon performance, the EU CBAM risks compounding existing vulnerabilities.

At the same time, a country can be simultaneously advantaged and disadvantaged depending on the sector, the scope of emissions covered and the stage of policy evolution. Moreover, the mechanism's evolving scope, with downstream product extensions and the potential inclusion of indirect emissions, means that today's winners could become tomorrow's losers, and vice versa. Navigating this landscape requires African countries to move beyond reactive postures and towards a proactive, coordinated continental strategy that combines diplomatic engagement with targeted domestic reforms while investing in MRV capacity.

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2 Per Article 3(21) of the EU CBAM regulation: 'direct emissions' means emissions from the production processes of goods, including emissions from the production of heating and cooling that is consumed during the production processes, irrespective of the location of the production of the heating or cooling. Per Article 3(34) of the CBAM regulation, 'indirect emissions' means emissions from the production of electricity, which is consumed during the production processes of goods, irrespective of the location of the production of the consumed electricity.

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5 Accreditation requires demonstrating the competence and ability to properly verify emissions data and information, with national accreditation bodies evaluating staff qualifications and experience, internal quality assurance and procedures, independence and impartiality, and resources and systems for data review, testing and reporting. Once accredited, the verifier must physically visit the installation where the relevant goods are produced in the first year of reporting. Virtual visits may be permitted thereafter under specific conditions.

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