AFRICAN CLIMATE FOUNDATION

LSE Firoz Lalji Institute for Africa

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

TRADE AND CLIMATE SUSTAINABILITY 2026 SERIES

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

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The African Climate Foundation, established in 2020, is the first African-led strategic re-granter working at the nexus of climate change and development.

The Firoz Lalji Institute for Africa focuses on engagement with Africa through cutting-edge research, teaching and public events, strengthening LSE's long-term commitment to place Africa at the heart of understandings and debates on global issues.

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Acronyms and abbreviations

ACF	African Climate Foundation
AIMS	Africa's Integrated Maritime Strategy
AEL	Africa Express Line
AGII	Africa Green Industrialisation Initiative
APRI	Africa Policy Research Institute
AU	African Union
CEMZA	Combined Exclusive Maritime Zone of Africa
CIA	UNCTAD's comprehensive impact assessment
CIMC	China International Marine Containers
EU	European Union
EUA	EU Allowance
EU ETS	European Union Emissions Trading System
GDP	Gross domestic product
GHG	Greenhouse gas
ICAO	International Civil Aviation Organization
IEA	International Energy Agency
IMO	International Maritime Organization
IRENA	International Renewable Energy Agency
LDC	Least developed countries
LEAP	Leading Effective Afrocentric Participation
LNG	Liquified natural gas
LSE	London School of Economics and Political Science
NZF	Net-Zero Framework
OPS	Onshore power supply
PGMs	Platinum group metals
SCZONE	Egypt's Suez Canal Economic Zone
SIDS	Small island developing states
SMF	Sustainable maritime fuel
TUM	Technical University of Munich
UCL	University College London
UN	United Nations
UNCTAD	UN Conference on Trade and Development
UNECA	United Nations Economic Commission for Africa
UK	United Kingdom
UK ETS	UK emissions trading system

Preface

This policy brief aims to support African policy-makers engaged in decisions about maritime decarbonisation and its relationship with national and continental development aspirations. It is produced through a collaborative partnership between the African Climate Foundation and the London School of Economics Firoz Lalji Institute for Africa.

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. Section 1 of this policy brief outlines the main policies being implemented or under consideration, as well as Africa's priorities. Section 2 synthesises the impact research that is already in the public domain, taking a specifically African lens. Section 3 evaluates the potential opportunities presented by the various frameworks. Finally, Section 4 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.

Section 1: 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.

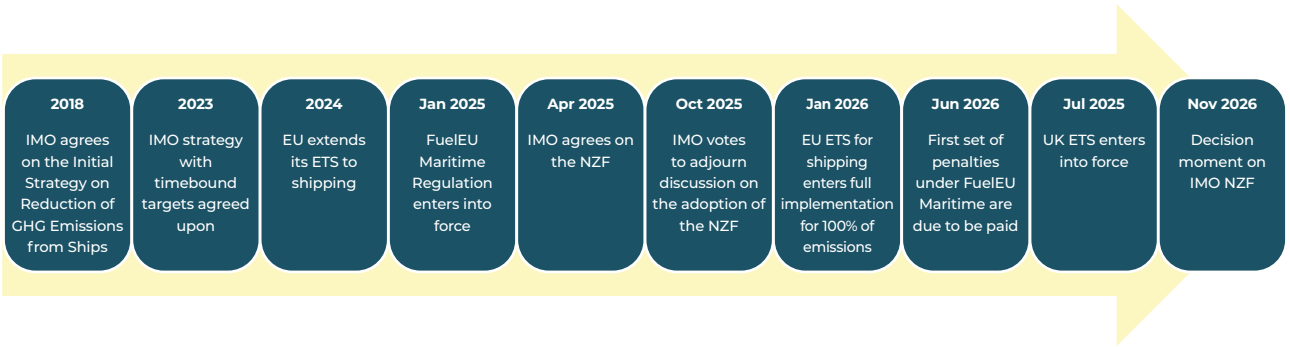
The FuelEU Maritime Regulation

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 focusses 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, focusses 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.

Section 2: 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 focussed 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 focussing 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 €223 per 20-foot container and €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 €2.5 million in 2024, rising to €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 €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-focussed 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] 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.[15]

- **Fuel intensity standards** were found to increase fuel and compliance expenses leading to higher shipping costs or freight rates for African countries.[16] 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.[17] 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[18]

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.[19]

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.[20]

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.

Section 3:
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.

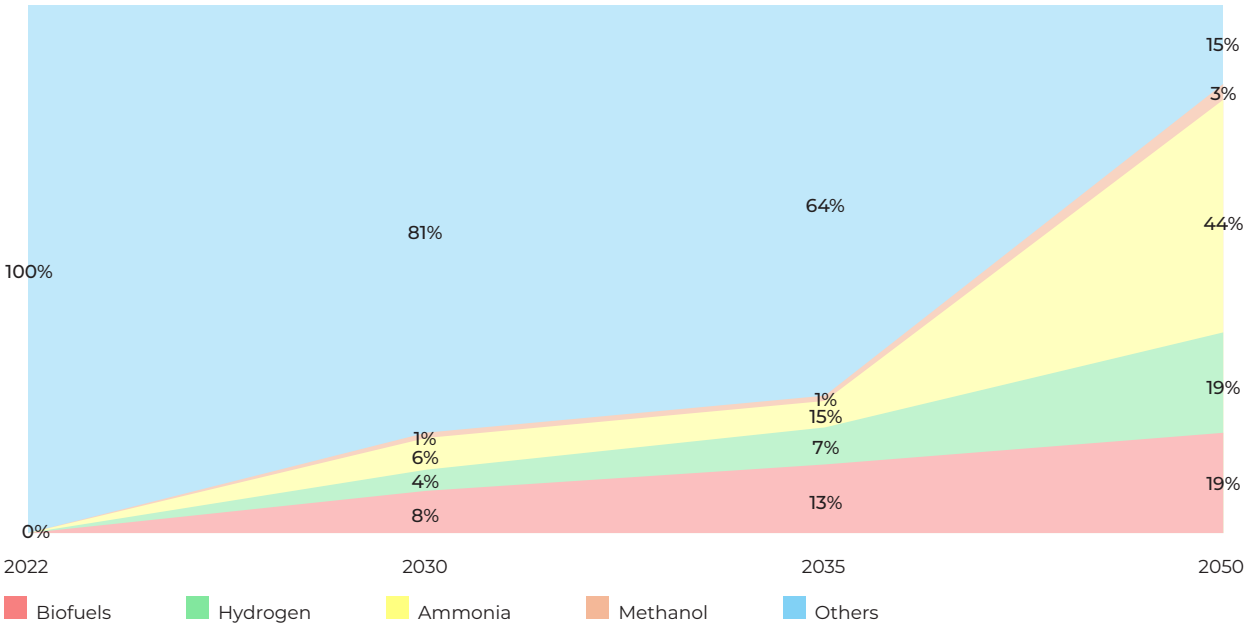
Table 3: SMF technologies – readiness and ease of use

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[21]

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[22]

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.[23] 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.[24]
- **Hydrogen** (1.4% of the current SMF market):[25] 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.[26] 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.[27]
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.[28] 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.[29] 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.[30]

Country	Primary fuel focus	Strategic advantage	2025/2026 status update
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.[31] 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.[32] 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.[33]
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.[34]
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.[35]

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.[36]
- 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.[37]
- Spain: in March 2026, €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'.[38] 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.[39]

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.[40]
- 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.[41]
- 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.[42]

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.

Section 4: Conclusions 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.

1. 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.

2. 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.

3. **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.

4. **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.

5. **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.

Endnotes

1 United Nations Economic Commission for Africa (UNECA) (2016) *Africa's Blue Economy: A policy handbook*. Addis Ababa: UNECA. Available at https://archive.uneca.org/sites/default/files/PublicationFiles/blue-eco-policy-handbook_eng_1nov.pdf

2 European Parliament (2025) ETS/FuelEU Maritime and IMO NZF – risk of double taxation. Parliamentary question – P-002734/2025. Available at https://www.europarl.europa.eu/doceo/document/P-10-2025-002734_EN.html

3 International Maritime Organization (IMO) (2025) The IMO Net-Zero Framework – FAQs. Available at https://www.imo.org/en/mediacentre/hottopics/pages/faqs-the-imo-net-zero-framework.aspx

4 Ogbugo M (2025) Africa needs a coordinated position on the IMO's Net Zero Framework. Africa at LSE, The London School of Economics and Political Science. Available at https://blogs.lse.ac.uk/africaatlse/2025/10/14/africa-needs-a-coordinated-position-on-the-imos-net-zero-framework/

5 Manchishi S, Ogbugo M & Rumble O (2025) The inequity of evolving EU climate regulations for African countries. Africa Future Policies Hub

6 European Commission (2025) FAQ – Maritime transport in EU Emissions Trading System (ETS). Available at https://climate.ec.europa.eu/eu-action/transport-decarbonisation/reducing-emissions-shipping-sector/faq-maritime-transport-eu-emissions-trading-system-ets_en

7 Maersk (2025) Emissions surcharge (EMS/ESS). Available at https://www.maersk.com/news/articles/2025/12/01/emissions-surcharge-ems-ess

8 Ogbugo ME (2024) An analysis of the implications of EU-ETS for shipping in Africa. *Citi Newsroom*. Available at https://citinewsroom.com/2024/01/an-analysis-of-the-implications-of-eu-ets-for-shipping-in-africa-article/?utm

9 European Commission (2025) *Report from the Commission: Monitoring of the Implementation of Directive 2003/87/EC in Relation to Maritime Transport*. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52025DC0110

10 Cudjoe K (2024) African countries face economic strain from proposed maritime carbon tax – report warns. *Business & Financial Times (B&FT Online)*. Available at https://thebftonline.com/2024/10/15/african-countries-face-economic-strain-from-proposed-maritime-carbon-tax-report-warns/

11 Manchishi S, Ogbugo M & Rumble O (2025) The inequity of evolving EU climate regulations for African countries. Africa Future Policies Hub

12 Africa Express Lines (nd) Lines and schedules. Available at https://www.africaexpressline.com/lines-and-schedules/

13 Ogbugo M, Davis W, Omoju O, Luke D & Aggad F (2024) Navigating climate action: Assessing the economic impacts and trade-offs of a shipping carbon tax for African states. Africa Policy Research Institute. Available at https://afripoli.org/navigating-climate-action-assessing-the-economic-impacts-and-trade-offs-of-a-shipping-carbon-tax-for-african-states

14 IMO (2023) Mid-and long-term GHG reduction measures. Available at https://www.imo.org/en/ourwork/environment/pages/mid--and-long-term-ghg-reduction-measures.aspx?utm_source=chatgpt.com

The scenarios were:
- Scenario 24: GFS with a flexibility mechanism, no levy or feebate
- Scenario 26: GFS without a flexibility mechanism, with a levy (US$150–300), no feebate
- Scenario 32: GFS with a flexibility mechanism and a levy (US$30–120), no feebate
- Scenario 36: GFS with a flexibility mechanism, no levy and a feebate

15 IMO Marine Environment Protection Committee (2024) Reduction of GHG Emissions from Ships: Report of the comprehensive impact assessment of the basket of candidate GHG reduction mid-term measures – full report on Task 3 (Impact on States). Available at https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/MEPC%2082-INF.8-Add.2%20-%20Report%20of%20the%20Comprehensive%20impact%20assessment%20of%20the%20basket%20of%20candidate%20GHG%20reduction%20mid...%20(Secretariat).pdf

16 UN Conference on Trade and Development (UNCTAD) (2023) *Review of Maritime Transport 2023*. Available at https://unctad.org/publication/review-maritime-transport-2023

17 Petrus H, Mwale M, Stewart J, Fricaudet M & Oluteye D (2025) *Complementary quantitative stakeholders' analysis: The case study of Namibia*. University College London (UCL) Bartlett Faculty of the Built Environment. Available at https://www.ucl.ac.uk/bartlett/publications/2025/feb/complementary-quantitative-stakeholders-analysis-case-study-namibia

18 Mwale M, Petrus H, Stewart J, Fricaudet M & Oluteye D (2025) Complementary quantitative stakeholders' analysis: The case study of Malawi. UCL Bartlett Faculty of the Built Environment. Available at https://www.ucl.ac.uk/bartlett/publications/2025/feb/complementary-quantitative-stakeholders-analysis-case-study-malawi;

Petrus H, Mwale M, Stewart J, Fricaudet M & Oluteye D (2025) Complementary quantitative stakeholders' analysis: The case study of Namibia. UCL Bartlett Faculty of the Built Environment. Available at https://www.ucl.ac.uk/bartlett/publications/2025/feb/complementary-quantitative-stakeholders-analysis-case-study-namibia;

Agunbiade F, Ofodile C, Stewart J, Fricaudet M & Oluteye D (2025) Impact assessment of the IMO basket of candidate mid-term GHG reduction measures: The Nigeria case study – A case study report. The Professional African Technical Network Advisory (PATNA) Initiative. Available at https://thepatna.org/wp-content/uploads/2026/02/Impact-Assessment-of-the-IMO-candidate-mid-term-GHG-reduction-measures-Nigeria-Case-Study.pdf

19 International Transport Forum (2022) *Carbon Pricing in Shipping: Case-specific policy analysis*. International Transport Forum Policy Papers no. 110. Paris: OECD Publishing. Available at https://www.oecd.org/content/dam/oecd/en/publications/reports/2022/12/carbon-pricing-in-shipping_0cc1863c/250921ec-en.pdf

20 Fricaudet M, Fabiano F & Smith T (2025) Food security, IMO mid-term measures' impact on states and revenue distribution – Analysing synergies and risks. UCL, IDDRI & CIRAD. Available at https://www.shippingandoceans.com/post/new-analysis-shows-a-shifting-landscape-with-strong-support-for-a-carbon-price

21 Future Fuels and Technology (nd) Supporting MEPC decision-making. Available at https://futurefuels.imo.org/about/

22 International Energy Agency (IEA) (2023) Aviation and shipping: Net Zero Emissions Guide. Available at https://www.iea.org/reports/aviation-and-shipping

23 International Shipping News (2026) WinGD and Envision Energy study shows path to green ammonia cost parity. Available at https://www.hellenicshippingnews.com/wingd-and-envision-energy-study-shows-path-to-green-ammonia-cost-parity/

24 Bioenergy International (2026) 2025 a watershed year for renewable and low-carbon methanol projects. Available at https://bioenergyinternational.com/2025-a-watershed-year-for-renewable-and-low-carbon-methanol-projects/#:~:text=In%202026%2C%20GENA%20expects%20that,the%20number%20of%20frozen%20projects.

25 Market.us (2025) Global sustainable marine fuel market. Available at https://market.us/report/sustainable-marine-fuel-market/

26 Mao X, Zhou Y, Meng Z & Cho HJ (2024) Green shipping corridors: Screening first mover candidates for China's coastal shipping based on energy use and technological feasibility. The International Council on Clean Transportation (ICCT). Available at https://theicct.org/wp-content/uploads/2024/07/ID-182-%E2%80%93-Shipping-corridors_final.pdf

27 Labrut M (2023) Maersk's C2X sign with Egypt for developing green methanol. *Seatrade Maritime News*. Available at https://www.seatrade-maritime.com/sustainability/maersk-s-c2x-sign-with-egypt-for-developing-green-methanol

28 Hernandez A (2024) TotalEnergies studies Moroccan project to export green ammonia to Europe. *Reuters*. Available at https://www.reuters.com/business/energy/totalenergies-studies-moroccan-project-export-green-ammonia-europe-2024-10-29/

29 Mkoko S (2025) Namibia opens solar-powered green hydrogen hub. ESI Africa. Available at https://www.esi-africa.com/news/namibia-opens-solar-powered-green-hydrogen-hub/

30 African Development Bank (2025) African Development Bank approves $10 million to catalyse Namibia's large green hydrogen project. Available at https://www.esi-africa.com/news/namibia-opens-solar-powered-green-hydrogen-hub/

31 Global Maritime Forum (2025) Study shows South Africa–Europe shipping route could run on green ammonia by 2029. Available at https://globalmaritimeforum.org/press/south-africa-europe-shipping-route-could-run-on-green-ammonia-by-2026/

32 Hive Energy (nd) Green ammonia. Available at https://www.hiveenergy.co.uk/clean-futures/green-ammonia/

33 Green Hydrogen Organisation (nd) GH2 country portal – Mauritania. Available at https://gh2.org/countries/mauritania

34 Du Couedic T (2024) How Djibouti will produce 100% green energy by 2035. *Africa Business*. Available at https://african.business/2024/05/dossier/how-djibouti-will-produce-100-green-energy-by-2035

35 Global Maritime Forum (2025) Powering green shipping: Kenya in the global power-to-x economy. Available at **https://globalmaritimeforum.org/insight/powering-clean-shipping-kenya-in-the-global-power-to-x-economy/**

36 Vassileva A (2025) Saudi Arabia's Neom green hydrogen project is 90% complete. Renewables Now. Available at **https://renewablesnow.com/news/saudi-arabias-neom-green-hydrogen-project-is-90-percent-complete-1287161/**

37 Atchison J (2026) Envision delivers first renewable cargo to South Korea. Ammonia Energy Association. Available at **https://ammoniaenergy.org/articles/envision-delivers-first-renewable-cargo-to-south-korea/**

38 International Renewable Energy Agency (IRENA) (2025) **Enabling green hydrogen development: North Africa**

39 Egli F, Schneider F, Leonard A, Halloran C, Salmon N, Schmidt T & Hirmer S (2025) Mapping the cost competitiveness of African green hydrogen imports to Europe. *Nature Energy* 10: 750–761. Available at **https://www.nature.com/articles/s41560-025-01768-y**

40 Deloitte (2024) Law no. 2 of 2024 summary. Available at **https://www.deloitte.com/middle-east/en/services/tax/perspectives/law-no2-of-2024-summary.html**

41 Hyphen Hydrogen Energy (2023) **The government of the Republic of Namibia and Hyphen Hydrogen Energy sign US$10 billion green hydrogen project agreement at official ceremony**. Hyphen Energy. Available at **https://hyphenafrica.com/the-government-of-the-republic-of-namibia-and-hyphen-hydrogen-energy-sign-us10-billion-green-hydrogen-project-agreement-at-official-ceremony/#**

42 Boudribila K & Nasrollah K (2024) **Morocco: Green hydrogen – the Moroccan offer**. *Global Compliance News*. Available at **https://www.globalcompliancenews.com/2024/04/20/https-insightplus-bakermckenzie-com-bm-projects-morocco-green-hydrogen-the-moroccan-offer_03192024/**

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