The case for binding African Union law on the environmental impact of civil aviation

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SUMMARY

Civil aviation is a growing economic sector in Africa. Like all industries, it presents significant environmental issues, including noise pollution and high carbon emissions. The central problem is that the African Union lacks a single binding law to regulate these environmental impacts. Instead, it relies on non-enforceable policy instruments. This article focuses on the African Civil Aviation Policy and Agenda 2063, which calls for measures to reduce emissions and noise. The article concludes that while these instruments are a significant step towards protecting the environment from the negative effects of civil aviation, their effectiveness is undermined by a lack of enforcement mechanisms, resource constraints and varied political will among member states. Therefore, a binding African Union legal framework is necessary to ensure the sustainable development of an environmentally friendly civil aviation industry in Africa.

1 Introduction

The aviation industry is an important sector of the African economy because it facilitates international travel and trade.[1] Estimates suggest that Africa's civil air traffic accounts for 2-3 % of the worldwide output of passengers and cargo.[2] While this share appears negligible today, studies suggest that passenger numbers will rise from 175 million in 2024 to 345 million in 2043.[3] This represents a compound growth of almost 4 % per year and is projected to outpace mature markets such as Europe and North America.[4] While the estimates illustrate Africa's growth potential, the continent's aircraft are fuel-inefficient due to age. The average African fleet age is 16.5 years against a global average of 11.6 years, meaning that every seat-kilometre flown in Africa contributes 10-20 %

1 Köhler "Globalization and sustainable development: Case study on international transport and sustainable development" 2014 *Journal of Environment & Development* 66; 123-137.
2 See Hannemann "Connecting Africa: unlocking Africa's intra-regional connectivity potential" Available at: https://www.embraercommercialaviation.com/news/embraer-highlights-potential-for-intra-african-air-connectivity-growth/ (accessed 21-01-2024).
3 Ecofin Agency 'Sustainable fuel costs ground African aviation dreams' https://www.ecofinagency.com/news/2406-47389-sustainable-fuel-costs-ground-african-aviation-dreams (accessed 23-06- 2025).
4 Hannemann "Connecting Africa".

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more carbon than the worldwide average.[5] This is problematic for Africa and the world at large because the aviation industry has a huge environmental footprint.[6]

Globally, aviation has enormous carbon emissions, which account for at least 2.5% of combined emissions.[7] In perspective, the aviation industry contributes 3% of all carbon emissions from oil products (making its contribution three times more carbon emissions than petrol and diesel).[8] As such, the environmental impacts of the aviation industry are huge and are amplified by the fact that aircraft often fly at high altitudes and thus impact the ozone layer, and by implication, cause climate change. Aviation fuels contribute nitrogen dioxide at high altitudes, while condensation trails, which form cloud-like formations on the paths of aircraft exhaust,[9] affect the global climate systems through radiative forcing and warming and cooling.[10] In this context, it is clear that without binding legal instruments, Africa's civil aviation industry will contribute more emissions as it grows.

In addition to the environmental concerns raised above, the aviation industry also contributes to noise pollution, which can affect human health through sleep disturbance, cardiovascular disease and cognitive impairment in children.[11] Wildlife also suffers from aviation noise, which causes stress and disturbs animals from sleeping, feeding, foraging, and reproducing.[12] It is not only the inhabitants of the land (humans and animals) who suffer from aviation impacts. The environment itself also suffers, as airports and other aviation facilities require large tracks of

5 IATA "Balancing fleet age for efficiency and sustainable growth" Available at: https://www.iata.org/en/iata-repository/publications/economic-reports/chart-of-the-week-8-sep/ (accessed 23-07-2025).

6 Grewe *et al* "Mitigating the climate impact from aviation: Achievements and results of the DLR WeCare project" 2017*Aerospace* 34 2.

7 Capaz *et al* "Mitigating carbon emissions through sustainable aviation fuels: costs and potential" 2021 *Biofuels, Bioproducts and Biorefining* 502.

8 Capaz *et al Biofuels, Bioproducts and Biorefining* 503.

9 See Fahey & Lee "Aviation and climate change: a scientific perspective" 2016 *Carbon & Climate Law Review* 97, 98.

10 Burkhardt & Kärcher "Global radiative forcing from contrail cirrus" 2011 *Nature Climate Change* 54.

11 For a discussion of these health impacts of aviation on humans, see Peters *et al* "Aviation noise and cardiovascular health in the United States: A review of the evidence and recommendations for research direction" 2018 *Current epidemiology reports* 140; Basner *et al* "Aviation noise impacts: state of the science" 2017 *Noise & Health* 41, 41-50.

12 In 1985, studies indicated that it was near impossible to draw definite conclusions on how the aviation industry affects wildlife on land and see, although it was accepted that animals are vulnerable to higher noise levels such as generated by aircraft. Subsequent studies, such as Pepper *et al* "A review of the effects of aircraft noise on wildlife and humans, current control mechanisms, and the need for further study" 2003 *Environmental Management* 418; Wolfenden *et al* "Aircraft sound exposure leads to song frequency decline and elevated aggression in wild chiffchaffs" 2019 *Journal of Animal Ecology* 1720 established the connection between aviation noise and changes to wildlife behaviour.

land, the clearance of which disturbs natural ecosystems and habitats and leads to pollution.[13] Studies indicate that the construction and operation of these facilities contribute to environmental degradation through the emission of pollutants, the generation of waste and increased water usage.[14] This may strain ecologically sensitive areas, particularly in Africa, which is experiencing a disproportionate share of climate change impacts arising from aviation and other industries happening even beyond the borders of the continent.[15]

This article explores how environmental regulation through the African Union policy instruments may protect the environment from the impacts of the aviation industry. To this end, it examines how three principal African Union instruments, namely the African Civil Aviation Policy, the Single African Air Transport Market and Agenda 2063, protect African skies, land and water bodies from carbon emissions and noise pollution, among other environmental concerns. To achieve the above aims and objectives, the article uses doctrinal legal analysis, which is the main legal research method.[16] This method entails the analysis of both primary and secondary legal sources on the justification of using international law (in this case, African Union policy instruments) to regulate the aviation industry for environmental protection.[17] This method is relevant and beneficial to the determination of the nature and content of African Union policy instruments on environmental protection through the regulation of the aviation industry.

This article is structured as follows. The second part is an overview of the international regulation of civil aviation within the African context. The third section continues the discussion with a focus on the role of the African Civil Aviation Commission in environmental governance. The fourth section analyses the African Civil Aviation Policy, specifically its provisions related to environmental protection. It also discusses sustainable aviation strategies in Africa that stem from this policy. The fifth section discusses how Agenda 2063 envisages environmental protection from aviation. The sixth section provides a consolidated review of the challenges and gaps in these two African Union policy instruments. The last section concludes the paper and offers recommendations for strengthening environmental protection from civil aviation in Africa.

13 See Greer *et al* "Airports and environmental sustainability: A comprehensive review" 2020 *Environmental Research Letters* 103007.

14 Wan *et al* "Temporal and spatial effects of large airport construction and operation on the local thermal environment" 2023 *Environmental Science and Pollution Research* 13788.

15 Tadesse "The impact of climate change in Africa" 2010 *Institute for Security Studies Papers* 1.

16 Hutchinson & Duncan "Defining and describing what we do: doctrinal legal research" 2012 *Deakin Law Review* 83.

17 Pradeep "Legal research - descriptive analysis on doctrinal methodology" 2019 *International Journal of Management, Technology and Social Sciences* 95.

2 Overview of the international regulation of civil aviation

Part of the context for the need for African Union policy instruments to regulate the environmental impact of aviation stems from the international recognition of the need to use international law to regulate aviation to make it safe, secure and environmentally sustainable. The International Convention on Civil Aviation (known as the Chicago Convention) is the principal instrument in this regard and has been signed, ratified and domesticated by many States Parties, including African ones. In fact, the Chicago Convention recognises the African Civil Aviation Commission as one of the regional commissions for its implementation.[18] The use of international instruments such as the Chicago Convention to regulate aviation stems from several justifications of international law as an instrument for international peace, security and sustainable development.[19]

The African Union, a supranational body which is the focus of this article, is a regional body established in 2001 by the Constitutive Act of the African Union[20] to succeed the erstwhile Organisation of African Unity. This body comprises 55 member states and was established to promote unity, solidarity, security, peace, and cooperation among its members.[21] It is also responsible for the formulation of policies for the aviation sector[22] through the African Civil Aviation Commission.[23] As one of several supranational bodies, the African Union exercises lawmaking powers to facilitate collective action by its members on matters of mutual interest, such as aviation.[24] In this context, this section considers the utility of African Union policy instruments in environmental protection from the effects of aviation and the capacity of its instruments to protect the environment in this regard.

Given that the 55 African Union member states have different legal systems and various forms of environmental regulation, it is imperative to ensure that they have a common approach to the prevention, mitigation and adaptation to common challenges, such as environmental

18 Article 55.
19 There are many contestations on the efficacy of international law and its instruments in regulating the international order. These fall outside the purview of this paper. For a further discussion, see Goldsmith & Posner *The limits of international law* 2005.
20 Constitutive Act of the African Union.
21 See the list of African Union members in African Union 'Member states' https://au.int/en/member_states/countryprofiles2 (accessed 14-01-2023).
22 African Civil Aviation Policy 1.5.1.2.
23 As above, 1.5.1.4.
24 See art 3 of the Constitutive Act of the African Union. For a discussion of the lawmaking powers of supranational bodies, see Fagbayibo "From OAU to AU: rethinking supranational governance in Africa" in Oloruntoba & Falola (eds) *The Palgrave handbook of African politics, governance and development* (2018) 771-782.

concerns arising from the impact of the aviation sector. Given the transnational nature of aviation, standardised environmental laws and regulations brought by African Union instruments – which are binding on member states – are necessary to ensure effective enforcement and compliance.[25] In this context, legal standardisation refers to establishing a common framework of rules, guidelines, and practices that ensure that member states have aligned operational procedures, emissions standards, and noise control measures.[26] Arguably, standardising regulation in this way would streamline compliance for airlines operating in multiple African states and facilitate their monitoring and enforcement of environmental standards that are enshrined in African Union policy instruments, as will be discussed below.

Harmonisation, on the other hand, is the process of bringing different national laws and policies into alignment with each other.[27] This is particularly crucial in Africa, where varying levels of economic development and diverse legal systems can lead to a fragmented regulatory landscape.[28] Harmonising environmental regulations will enable the African Union to ensure that all member states adhere to a minimum standard of environmental protection, thus mitigating the risks of regulatory arbitrage where airlines might seek to operate in countries with less stringent environmental laws.[29]

From the foregoing discussion, it can be seen that standardisation and harmonisation of environmental laws of specific African states through the adoption of overarching African Union policy instruments can lead to efficiency in environmental regulation by each state, enhanced compliance due to easier monitoring and enforcement across Africa; promotion of sustainable practices on efficient fuels; and levelling of the playing field by ensuring that all airlines across Africa operate under the same environmental laws and have the same obligations to the

25 See Olivier "The role of African Union law in integrating Africa" 2015 *South African Journal of International Affairs* 513 on the binding nature of African Union law and how it contributes to regional integration.

26 See Faure & Philipsen "The Legitimacy of Standardisation as a Regulatory Technique: A Cross-disciplinary and Multi-level Analysis" in Eliantonio & Cauffman (eds) *Standardisation from a law and economics perspective* (2020) 156–178 on the need for legal standardisation in general.

27 Ferreira-Snyman "The Harmonization of Laws within the African Union and the Viability of Legal Pluralism as an Alternative" 2010 *Tydskrif vir Hedendaagse Romeins-Hollandse Reg* 608 discussed harmonisation with specific reference to African Union law.

28 Ferreira-Snyman 2010 *Tydskrif vir Hedendaagse Romeins-Hollandse Reg* 610.

29 For a discussion of harmonisation of environmental law can mitigate risks to the environment and result in better protection, see Faurie, "Balancing of interests: some preliminary (economic) remarks" in Faure & Du Plessis *The balancing of interests in environmental law in Africa* (2011) 15-16.

environment.[30] This itself requires a high degree of collaboration and coordination among African Union member states:

> A close analysis of the civil aviation problems in Africa indicates commonality in almost all the States leading to the conclusion that collaboration and coordination among African States would result in the optimisation of the scarce resources.[31]

Although African Union policy instruments may result in standardisation and harmonisation of environmental regulation of the aviation sector, it is necessary to consider that laws alone are not sufficient and that any supranational body that makes laws needs to have the capacity to bring such laws into effect.[32] In this context, the following section briefly considers the capacity of the African Union to address environmental concerns arising from the activities of the aviation sector. In discussing the capacity of African Union policy instruments to address environmental issues wrought by the aviation sector, the following section first considers the role of the African Civil Aviation Commission in environmental protection.

3 The role of the African Civil Aviation Commission in environmental governance

The African Civil Aviation Commission is established and mandated by the African Union to oversee aviation matters on the continent. It was established in 1969 through the African Civil Aviation Authority Constitution to foster a safe, secure, efficient, cost-effective, sustainable and environmentally friendly civil aviation industry in African states.[33] This vision is codified in the functions and strategic objectives of the Commission, which explicitly mandates the African Civil Aviation Commission to foster the implementation of International Civil Aviation Organisation Standards and Recommended Practices on safety, security and environmental protection among member states.[34] It must also develop and harmonise common rules and regulations for environmental protection among states. These duties place environmental stewardship at the centre of the African Civil Aviation Commission's legal and institutional identity, particularly given that

30 For a general view of these benefits of harmonisation and standardisation of African laws through the African Union, see Fagbayibo "Towards the harmonisation of laws in Africa: is OHADA the way to go?" 2009 *Comparative and International Law Journal of Southern Africa* 309; Arthur "Harmonisation in Africa" 2019 *Quality Assurance and Safety of Crops & Foods* 613.

31 African Civil Aviation Policy 1.2.8.

32 This is one of the main issues in the enforcement of international law and has been highlighted as early as the mid-19th Century – Fitzmaurice "The foundations of the authority of international law and the problem of enforcement" 1956 *The Modern Law Review* 1.

33 African Civil Aviation Commission Constitution 1969.

34 As above, art 4.1.

environmental protection is one of its six core strategic objectives alongside safety, air transport, security, legal and human capacity building.[35]

It is necessary to note that the African Civil Aviation Authority is the Executing Agency of the Yamoussoukro Decision, whose flagship project is the Single African Air Transport Market, which provides the institutional channels for environmental governance.[36] The Yamoussoukro Decision addresses safety, security and environmental challenges in its framework for the liberation of African skies. This gives the African Civil Aviation Commission a mandate to integrate environmental considerations in air transport liberalisation. The legal department of the African Civil Aviation Commission develops and implements the primary document that contains the environmental provisions for the sector, which is the African Civil Aviation Policy.[37]

The African Civil Aviation Commission has translated its broad mandate into several concrete programs aimed at assisting member states in mitigating the environmental impact of aviation.[38] These initiatives focus primarily on capacity building and coordinating a unified African position on global environmental measures.[39]

A cornerstone of the African Civil Aviation Commission's environmental work is providing technical assistance to states for the development and updating of their State Action Plans (SAPs) for CO2 emissions reduction.[40] In collaboration with the International Civil Aviation Organisation (ICAO), the African Civil Aviation Commission helps map out support, allocate funding, and conduct capacity-building sessions for national experts. This support is critical, as ICAO Assembly Resolution A41-21[41] requires states to update their SAPs every three years. As of June 2023, 39 African states (71 %) had submitted State Action Plans (SAPs). However, the data also reveals a persistent implementation challenge: 21 of those submitted plans (53 %) were more

35 As above, art 3(3).
36 AFCAC "Sustainable aviation fuel, LCAF & cleaner energies: development and deployment" https://arab-forum.acao.org.ma/uploads/presentation/AFCAC_Presentation.pdf (accessed 23-06-2025).
37 African Civil Aviation Policy.
38 International Civil Aviation Organisation "AFCAC initiatives on environmental protection in Africa" https://www.icao.int/ESAF/Documents/meetings/2023/8th%20AFI%20Week%2021%20-%2025%20August%202023/AFI%20Week%20Symposium%2021-25%20August%202023/7Session%206%20_ENV/S6_PPT_2a_AFCAC_ENV%20Presentation.pptx%20Final%20Rev%203%20210823.pdf (accessed 29-06-2025).
39 As above.
40 As above.
41 International Civil Aviation Organisation "Resolution A41-21: Consolidated Statement of Continuing ICAO Policies and Practices Related to Environmental Protection" https://www.icao.int/Meetings/a41/Documents/Resolutions/a41_res_prov_en.pdf (accessed 1-07-2025).

than three years old and required updating, underscoring the need for continuous monitoring and support.[42]

The African Civil Aviation Commission is also central to Africa's engagement with the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).[43] It works closely with ICAO's Assistance, Capacity-building and Training for CORSIA (ACT-CORSIA) program and partners like the European Union Aviation Safety Agency (EASA) to deliver workshops and targeted technical assistance on monitoring, reporting, verification, and regulatory updates.[44] Up to January 2023, this effort had encouraged 21 African states to volunteer for the scheme.[45] In addition to technical support, the African Civil Aviation Commission plays a crucial diplomatic role in advocating for the common African position within ICAO, which includes maintaining the 2019 emissions baseline to account for the impacts of the COVID-19 pandemic and preserving exemptions for Least Developed Countries, Landlocked Developing Countries, and Small Island Developing States.[46]

The African Civil Aviation Commission has also undertaken initiatives on African Strategy for Sustainable Aviation Fuel (SAF) and Low Carbon Aviation Fuel (LCAF), both of which recognise Africa's vast potential in biofuel production. The African Civil Aviation Commission has established an ambitious strategy aiming for a 2-5% CO_2 reduction by 2030 and a 75-80% reduction by 2050 through the deployment of these fuels.[47] To operationalise this, the African Civil Aviation Commission has launched an African States' index to collect data on SAF activities, established an expert working group to develop policy options, and is actively working to facilitate access to finance for SAF production projects.[48]

Despite its comprehensive mandate and active programs, the African Civil Aviation Commission's effectiveness is fundamentally limited by a critical institutional limitation: it is not a regulator. The Commission's own official documents state this unequivocally: "we are not an African Aviation Regulator. Local and/or national laws shall prevail over any and all AFCAC guidelines".[49] Hence, the African Civil Aviation Commission is designed as a facilitator, coordinator, and mediator, not an enforcer, creating a problem in terms of which the African Civil Aviation Commission is tasked with driving the green transition in one of the most

42 As above.
43 As above.
44 As above.
45 As above.
46 International Civil Aviation Organisation "Views of the AFCAC member states on CORSIA implementation" https://www.icao.int/Meetings/a41/Documents/WP/wp_465_en.pdf (accessed 22-06-2025).
47 Annex 5 to the Yamoussoukro Decision: Regulations on Competition in Air Transport Services within Africa 2018.
48 As above.
49 AFCAC "About AFCAC: overview' https://www.afcac.org/afcac_overview/ (accessed 27-06-2025).

capital-intensive and technologically complex transitions in aviation history, using primarily soft power tools of persuasion, capacity-building and advocacy. This contradicts approaches in comparative jurisdictions such as the European Union, where EASA sets binding regulations, conducts inspections, issues fines and enforces penalties for non-compliance with environmental standards on noise, emissions and SAF uptake.[50] As such, one can argue that although the African Civil Aviation Commission has been given a mandate to achieve an outcome that requires robust enforcement, the tools needed for that enforcement have been denied. As demonstrated below, the gap between the African Civil Aviation Commission's expansive environmental responsibilities and its lack of enforcement authority is a primary cause of the policy implementation failures.

4 The African Civil Aviation Policy (2011)

4 1 Overview of the African Civil Aviation Policy

The African Civil Aviation Policy was adopted at the Conference of African Union Ministers Responsible for Transport, held in Luanda, Angola, from 21 to 25 November 2011.[51] This policy seeks to "foster a safe, secure, cost-effective, sustainable and *environmentally friendly* civil aviation industry in Africa."[52] It seeks to achieve this because of the recognition that there is a need for such a policy to improve civil aviation and because of the glaring lack of political will among African states to regulate aviation.[53] For this reason, the African Civil Aviation Policy notes that:

> The initiatives are generally not well coordinated and usually have differing perspectives and objectives, which present attendant insurmountable implementation challenges. To formulate well thought out and implementable policies there is a need for a coherent policy framework which inter alia outlines and solicits the necessary political commitment.[54]

50 Alcock "EASA to take the lead on decarbonising European aviation" https://www.ainonline.com/aviation-news/air-transport/2023-09-15/easa-take-lead-decarbonizing-european-aviation (accessed 28-06-2025).
51 African Civil Aviation Policy.
52 As above 2.1.1 (own emphasis). See also the African Union "The Single African Air Transport Market – an Agenda 2063 flagship project" https://au.int/sites/default/files/newsevents/workingdocuments/33100-wd-6a-brochure_on_single_african_air_transport_market_english.pdf (accessed 13-12-2023) 4, which states that the African Civil Aviation Policy "is the overarching framework document that provides the vision and strategic objectives for African Civil Aviation."
53 African Civil Aviation Policy 1.8.1.
54 As above, 1.8.1.

Hence, the African Civil Aviation Policy serves as a blueprint for formulating, collaborating and integrating national and regional initiatives on the regulation of the aviation sector.[55] This is important not only for dealing with the environmental problems caused by the aviation sector but also for the competitiveness of the African civil aviation airspace in the global economy, which requires a robust response to the impact of globalisation.[56] In line with the need for standardisation and harmonisation of civil aviation regulations, as discussed above, the African Civil Aviation Policy envisages that national policy formulation will be guided by it within African states.[57] In this regard, the African Civil Aviation Policy lays down issues that national decision-makers and policy-makers should address when regulating aviation. This includes periodic reviews of policy and legislation and the monitoring of the implementation of legislation and action plans for the improvement of the civil aviation sector.[58] The following section looks at specific provisions of the African Civil Aviation Policy that seek to protect the environment from the civil aviation sector.

4 2 Analysis of provisions related to environmental protection

It has already been noted that ensuring environmental friendliness in the aviation sector is one of the overarching objectives of the African Civil Aviation Policy. In addition, the policy states that some of its strategic objectives are to "foster sustainable development of Air transport in Africa"[59] and that the specific objective of African Union member states "is to ensure sustainable development of an environmentally friendly civil aviation industry."[60] This reference to sustainable development may be seen to flow from the Brundtland Report, which recognises three elements for sustainable development: environmental protection, economic development, and social development.[61] In the African context, there is a very strong connection between the principle of sustainable development and environmental protection.[62]

55 As above, 1.8.2.
56 As above, 1.8.3.
57 As above, 1.8.4.
58 As above, 1.8.5.
59 As above 2.3.
60 As above 10.1.1.1.
61 World Commission on Environment and Development "Our common future" 1987.
62 See Mwanza "The relationship between the principle of sustainable development and the human right to a clean and healthy environment in Kenya's legal context: an appraisal" 2020 *Environmental Law Review* 184 with specific reference to the Kenyan situation. For related analyses, see Dube & Manthwa "Putting people first in climate governance: the role of South Africa's indigenous values in securing ecologically sustainable development" in Addaney (eds) *Climate change in Africa: adaptation, resilience, and policy innovations* (2023).

Although some scholars view the principle of sustainable development as no more than a panacea built on false global consensus[63] and as no more than a neoliberalist approach to matters concerning the environment,[64] this article aligns with the view that any economic sector that affects the environment – such as aviation – needs to be regulated with sustainable development in mind. This is particularly relevant for the African Civil Aviation Policy which provides that member states of the African Union "shall take necessary measures to ensure continuous development and growth of civil aviation with minimal adverse impact on the environment."[65]

The environmental protection provisions of the African Civil Aviation Policy are found in Chapter 10, which recognises that aviation poses immense environmental challenges such as noise pollution, carbon emissions and climate change.[66] The African Civil Aviation Policy notes noise pollution is a significant concern due to the fact that residential developments around airports are continuing to grow and that this also exposes residents to contaminants emitted by aircraft, leading to health issues.[67] Hence, the African Civil Aviation Policy notes the need for reducing noise at its source (in this regard, from aircraft engine noise), spatial planning, noise abatement operational procedures and restrictions, and cost-efficiency.[68]

In recognition of the reality that aircraft emit 2 % of global greenhouse emissions and that this figure is estimated to grow up to 4 %, the African Civil Aviation Policy stipulates that policymaking in Africa should address the environmental impact of aircraft emissions to lower these carbon emissions.[69] To achieve this, the African Civil Aviation Policy states that there is a need for

> … the adoption of noise restriction and emissions standards, technological improvement in aircraft engines and fuel operational efficiency and introduction of market-based measures. Market-based measures include emissions trading, emission related levies - charges and taxes, and emissions offsetting.[70]

63 Kotzé and Adelman "Environmental law and the unsustainability of sustainable development: a tale of disenchantment and of hope" 2023 *Law and Critique* 227.
64 For a critique, see Kotzé *et al* "The problem with sustainable development: reimagining international environmental law's mantra principle through the lens of ubuntu" in Burdon (ed) *The Routledge handbook on law and the anthropocene* (2022) 3-17.
65 African Civil Aviation Policy 10.1.2.1.
66 As above 10.0.1.
67 As above 10.0.3.
68 As above 10.0.2. This approach is adapted from the Balanced Approach to Aircraft Noise Management, as adopted by the International Civil Aviation Organisation.
69 As above 10.0.4.
70 As above 10.0.5.

The African Civil Aviation Policy locates environmental protection from the aviation sector within the broader scope of international agreements, such as the United Nations Framework Convention on Climate Change and the Kyoto Protocol, both of which call upon developed states to assist their less developed counterparts in addressing climate change, such as carbon emissions.[71] For this reason, it appears that the African Civil Aviation Policy is based on the assumption that issues of environmental harm arising from aviation cannot be dealt with adequately by African states without their Global North counterparts – particularly given that Africa has no single aircraft-producing company and that it imports most of its aviation fuel from abroad. Hence, European and American jurisdictions in which civil aviation aircraft are produced and in which jet fuel is produced are in a better position to leverage their powers to compel aircraft manufacturers to make fuel-efficient engines and to produce more efficient fuels.

The African Civil Aviation Policy contains various strategies for achieving the environmental protection objective of growing civil aviation with minimal negative impact on the environment.[72] In this regard, it calls upon member states to implement regulations on reducing aircraft noise and engine emissions; improve fuel efficiency; adhere to the Climate Change Convention; design and implement market-based measures; improve air navigation through technology; promote environmentally friendly use of airspace; research into alternative aviation fuels; and share information on best practices.[73] These strategies are structured based on several realities. For instance, Jet-A fuel, which is premium and environmentally friendly, is unaffordable for many airlines, such that tax credits, long-term offtake agreements and blended-finance facilities are necessary to encourage its uptake.[74] This can only be done through legal reform and policy changes in the African Union's member states. Also, African airlines need to modernise their fleet to ensure fuel efficiency and thereby reduce emissions.[75] This can only be done through continent-wide pooled procurement and multilateral guarantee funds that lower capital costs of procuring new aircraft. Such agreements can only be entered into by member states in line with their formed laws.

Thus, it is clear that the African Civil Aviation Policy contains fundamental provisions on environmental protection in civil aviation and when implemented, its provisions will lead to the reduction of noise pollution, reduction in carbon emissions by aircraft engines, adoption of efficient fuels, and generally, sustainable aviation for the protection of the environment, human beings and wildlife, all of whom are affected by

71 As above 10.0.6-7.
72 As above 10.1.3.
73 As above 10.1.3.
74 Carnie "Sasol bids to fill growing demand for 'sustainable' jet fuel" https://www.dailymaverick.co.za/article/2024-10-13-sasol-bids-to-fill-growing-demand-for-sustainable-jet-fuel/ (accessed 25-06-2025).
75 As above.

aviation as discussed in section 2. For these outcomes to be achieved, there will be a need to strengthen implementation and enforcement mechanisms, enhance cooperation among states, and address resource and technological gaps, which are critical for the effective environmental management of the aviation sector in Africa.

4 3 Sustainable aviation strategies in Africa

Africa is uniquely positioned to become a major global player in decarbonising air transport through the production of Sustainable Aviation Fuel (SAF). A World Bank report estimates the continent has the potential to produce between 70 and 261 million tons of SAF, an enterprise that could generate between 11 and 20 million jobs.[76] This potential is rooted in the continent's vast biomass resources. South Africa, for instance, could produce up to 4.5 billion litres of SAF annually, which is more than double its domestic aviation fuel demand, from feedstocks such as sugarcane by-products and invasive alien plants.[77] However, this potential is limited to the extent that SAF is currently two to three times more expensive than conventional jet fuel, making it a prohibitive cost for most African airlines, which operate on thin margins and are often unprofitable.[78]

Another limitation to Africa's potential in producing SAF is that there are currently no commercial-scale SAF production facilities on the continent. Developing them requires massive capital investment and access to advanced refining technologies, both of which are scarce.[79] This problem is compounded by the fact that most African nations lack government mandates or incentives to create domestic demand for SAF, leading to a situation where valuable feedstocks, such as used cooking oil from South Africa, are exported to Europe for biofuel production rather than being leveraged to build a local SAF industry.[80] African Civil Aviation Commission's continent-wide SAF/LCAF Strategy and its collaborative workshops with key stakeholders represent the

76 Malina *et al* "The role of sustainable aviation fuels in decarbonizing air transport" https://documents1.worldbank.org/curated/en/099845010172249006/pdf/P17486308a996a08b098a10d078d421c6a3.pdf (accessed-06-2025) 43.

77 Harrington "South Africa could produce up to 4.5bn litres of SAF annually as IATA urges development priority" https://www.greenairnews.com/?p = 5918 (accessed 01-07-2025).

78 Chireshe *et al* "Cost-effective sustainable aviation fuel: Insights from a techno-economic and logistics analysis" 2025 *Renewable and Sustainable Energy Reviews* 115157.

79 Cui *et al* "Co-benefit scenario analysis on replacing aviation kerosene with sustainable aviation fuels in Africa" 2024 *Environmental Impact Assessment Review* 107318.

80 Van Grinsven *et al* "Used cooking oil (UCO) as biofuel feedstock in the EU" https://www.regenwald-statt-palmoel.de/images/pdf/CE_Delft_UCO.pdf (accessed 07-07-2025).

foundational steps needed to create a coordinated policy framework to overcome these barriers.[81]

For many airlines, the most immediate and impactful strategy for reducing emissions is fleet modernisation.[82] Given that the average age of the African aircraft fleet is nearly 20 years, replacing older, less efficient aircraft with new-generation models offers significant gains in fuel efficiency and reductions in noise and carbon emissions. Ethiopian Airlines stands out as a continental leader in this regard, having made substantial investments in modern aircraft like the Airbus A350-900 and Boeing 787-8, thereby operating one of the youngest and most fuel-efficient fleets in Africa.[83] Other major carriers, including Kenya Airways and Royal Air Maroc, are also pursuing fleet renewal strategies to enhance their environmental performance and competitiveness. However, the high capital cost of new aircraft remains a major barrier for smaller and less-capitalised airlines across the continent.

Progress towards sustainability is also accelerating, as a growing number of African airports making measurable commitments to carbon management. As of June 2024, 32 airports across the continent had achieved Airport Carbon Accreditation, a global standard for assessing and reducing airport emissions.[84] This progress reveals a two-track sustainability journey, where a cohort of proactive and well-resourced airport authorities are leading the way, creating models for the rest of the continent to follow.

5 Agenda 2063

Agenda 2063 is a strategic framework for the socio-economic transformation of Africa over a 50-year period from 2013 to 2063. This visionary agenda was conceptualised by the African Union (AU) as a comprehensive plan for sustainable development in various sectors, including aviation. The examination of Agenda 2063's vision for sustainable development is pivotal to understanding its implications for environmental protection in the aviation industry. However, it must be noted that Agenda 2063 does not contain specific provisions that can be enforced to protect the environment from aviation. For this reason, the analysis in this section infers how particular aspirations of Agenda 2063 can apply to the protection of the environment in the aviation sector. The inference is drawn from the list of seven aspirations in Agenda 2063.

81 AU "African ministers endorse landmark strategies to underpin climate resilience, promote alternative fuels" https://au.int/sw/node/44303 (accessed 12-07-2025).

82 Holnicki *et al* "Impact of vehicle fleet modernization on the traffic-originated air pollution in an urban area – case study" 2021 *Atmosphere* 1581.

83 Atsbaha *Efficiency and growth of Ethiopian air transport industry* 2022 1.

84 Air Carbon Accreditation "Reducing carbon and increasing airport sustainability" https://www.airportcarbonaccreditation.org/ (accessed 03-07-2025).

Aspiration 1 of Agenda 2063 focuses on the development of modernised infrastructure to ensure access to housing and other basic necessities, such as transport. Since transport includes civil aviation, one can argue that Aspiration 1 contributes to environmental protection in the civil aviation sector and that it can be realised through the construction of sustainable infrastructure, such as green airports and aviation logistics hubs in environmentally friendly ways that grow African economies. It could also mean using renewable energy sources and incorporating sustainable design and construction practices in airport infrastructure.

Another inferred contribution of Agenda 2063 to the aviation sector is that it seeks to grow innovation and technology by the adoption of sustainable technologies that will help the continent reduce the environmental impact of its activities – including civil aviation – and enhance its operational efficiency.[85] This is relevant for aviation, in which the impact on the environment (as seen above) can be reduced by innovation and technology that make aircraft engines more efficient and through research into aviation fuels that are more efficient and reduce carbon emissions. Although it has been seen in this sector that the development of aircraft engines and other civil aviation components and the making of aviation fuels are not generally performed within the continent, it can be argued that realising Aspiration 1 may in the long term place Africa in a position in which it can do so and compete with its global counterparts. Aspiration 1 of Agenda 2063 is also tailored for environmental sustainability in that it aspires to value and protect Africa's environment and ecosystems from being healthy and climate-resilient. This can be interpreted as a sustainable development initiative in that it recognises the importance of balancing environmental protection with economic development. Such balancing can be performed with regard to civil aviation, as discussed above.

Taken in their totality, the seven Aspirations of Agenda 2063 can be applied to environmental protection in civil aviation through sustainable infrastructure development; adoption of green technologies; harmonised environmental standards; enhanced connectivity and efficient transport; climate change mitigation and adaptation; and capacity building and knowledge sharing on matters of mutual interest such as civil aviation.

6 Challenges and gaps in African Union policy instruments

The first concern when it comes to the African Union's regulation of the aviation sector for environmental protection is what may be termed the Decarbonisation Catch-22 – African carriers operate on very thin margins (with a net profit of approximately $0.90 per passenger in

85 See Aspiration 1, which envisages "well educated and skilled citizens, underpinned by science, technology and innovation."

2024). For this reason, the capital expenditure for purchasing new-generation aircraft that are fuel efficient, as well as using premium fuel, are prohibitive. Although African airliners face these costs, they cannot ignore the need to decarbonise, as the EU and the UK are imposing mandatory premium fuel rules that risk pricing African airlines out of lucrative long-haul markets. To address this catch-22 situation, it will be necessary for the African Union to consider concessional finance, first-loss guarantees and regional leasing pools that will enable airlines to cut the cost of green assets such as modern aircraft. The African Union can also introduce blending mandates for fuel and tax-credit regimes to guarantee demand and reward early move. An AU-backed blended finance facility targeting a 5-year cut in average fleet from 16.5 to 12 years will ensure early adoption.

Another concern in facing the African Union in alleviating environmental concerns arising from the aviation sector, is its capacity to enforce its laws and policies. This issue is not limited to matters of the environment but extends to many issues confronting Africa today.[86] The main reason for this is that the African Union does not have a police force or enforcement mechanism and thus relies on the ability and willingness of its member states to implement its laws. This is particularly problematic, given the disparities in the capacities and commitments of African states to enforce not only African Union policy instruments but also their own domestic laws.[87] This is problematic. The effectiveness of the African Union's legal instruments in mitigating the environmental impact of the aviation sector depends on the ability and willingness of member states to implement them.

It can be argued that the disparities in the willingness and ability of African states to implement African Union policy instruments arise from differences in economic capabilities, governance structures, legal and regulatory frameworks that are rooted in colonialism, the political will to implement such laws and lack of public awareness of how standardised and harmonised laws may protect the environment. For these reasons, addressing these implementation challenges is crucial for the successful enforcement of environmental regulations across the continent. The next section will discuss the resource constraints faced by many African countries in investing in environmentally friendly aviation technologies and enforcing environmental regulations.

The second challenge to the implementation of the African Union in the environmental context on the issue of aviation in particular and other laws, is resource constraints faced by African states. Among its peers

86 See Martorana "New African Union: will it promote enforcement of the decisions of the African Court of Human and Peoples' Rights?" 2008 *George Washington International Law Review* 583 for a discussion.

87 This problem was highlighted in Solo & Geuldich "The challenges of ratification and implementation of treaties in Africa" https://au.int/sites/default/files/newsevents/conceptnotes/32072-cn-aucil_4th_forum_concept_note_eng.pdf (accessed 13-12-2023).

across the globe, Africa presents somewhat of a paradox in that states are endowed with a variety of natural resources, such as gold, platinum, oil and gas and a good climate for agriculture (in many parts of the continent) but is the poorest of all continents.[88] The causes of this poverty are many and range from centuries of colonisation suffered by African people, neocolonialism, embezzlement of state resources by governments, and poor leadership in general.[89] Persistent armed conflicts in some of the natural resource-rich states in the central and western parts of Africa have not helped the continent's developmental needs and might exacerbate the problems faced in standardising, harmonising and enforcing African Union policy instruments.[90]

The foregoing challenges stand in the way of the capacity of individual African states to enforce African Union policy instruments on environmental protection in general and in the aviation sector in particular. This is because "Africa grapples with aviation security challenges, especially due to the limited systems to mitigate the new and emerging threats against civil aviation".[91] Also, legal enforcement requires financial resources to procure technology and build the necessary human capital and infrastructure for legal enforcement. Therefore, Africa stands a better chance at protecting the environment from the aviation sector if its individual states address these resource constraints through concerted efforts.

In order to ensure that African Union policy instruments on environmental protection in the aviation sector are effective, African states also need to invest considerable effort and resources in monitoring and enforcement of such laws and regulations. For its part, the African Union may oversee the process of compliance by devising methods to ensure that its members enforce such laws. This may be achieved by first benchmarking how other supranational bodies, such as the European Union, ensure effective monitoring and enforcement of their laws.[92] Some of the ways to ensure effective monitoring and enforcement are the development of a monitoring system, empowering individual states to overcome enforcement challenges, building the capacity of regulatory bodies, fostering international cooperation and support to leverage global expertise and resources on environmental protection, and leveraging technology to enhance compliance.

88 See African Civil Aviation Policy 1.2.2.
89 Acemoglu & Robinson "Why is Africa poor?" 2010 *Economic History of Developing Regions* 21.
90 For a discussion of the scourge of armed conflicts in Africa, see Amsden "Grass roots war on poverty" 2012 *World Social and Economic Review* 114.
91 African Civil Aviation Policy 1.27.
92 For a discussion of how the European Union ensures compliance with its laws by member states, see Jakab & Kochenov *The enforcement of EU law and values: ensuring member states' compliance* (2017); Cremona *Compliance and the enforcement of EU Law* (2012).

7 Concluding remarks

This article finds that the African Union does not have a single enforceable legal instrument for the protection of the environment in the aviation sector. Instead, the African Union has one policy instrument that contains environmental protection provisions in the civil aviation sector. This instrument is the African Civil Aviation Policy which calls upon member states to reduce carbon emissions, adopt sustainable aviation fuels, and use efficient aircraft engines, among other sustainable practices. Although it holds a lot of promise for protecting the environment in aviation, the African Civil Aviation Policy may be undermined by challenges with implementation, as different African states have varying degrees of adoption, willingness and capacity to enforce its provisions. The other African Union instrument that is applicable to environmental protection in the aviation sector is Agenda 2063, which outlines a broad framework for Africa's long-term development and integrates environmental sustainability with aviation development. While it sets a visionary path as far as environmental sustainability is concerned, Agenda 2063 also suffers the same fate as the African Civil Aviation Policy in that it is not enforceable and also because there is a need for more targeted strategies and specific regulatory guidance to translate its vision into practical environmental stewardship in aviation.

The African Civil Aviation Policy and Agenda 2063 represent a significant step towards addressing the environmental impact of aviation in Africa as they highlight a growing recognition of the need for sustainable aviation practices and the importance of regional collaboration in this endeavour. However, the effectiveness of these instruments is contingent on factors such as resource availability, technological access, and political will. The balance between economic growth and environmental sustainability remains a critical consideration that Africa needs to reflect deeply on for its own development.

In order to bridge the gap between aspiration and action, the African Union must transition from its current soft law approach to a clear, enforceable, and incentivised framework for sustainable aviation. It is recommended that the African Union, through its established treaty-making processes, should consider developing and adopting a new African Union Protocol on Sustainable Aviation. This legally binding instrument must be created under the AU Constitutive Act and establish clear, mandatory, and continent-wide minimum standards. The content of this Protocol should include mandatory emissions monitoring, reporting, and verification, harmonised noise reduction standards, Sustainable Aviation Fuel mandates, and fleet modernisation incentives and standards.

A binding protocol is only effective if there is a body with the authority to oversee its implementation. To this end, the African Civil Aviation Commission's role must be strengthened through targeted amendments

to its Constitution, moving it closer to the effective regulatory oversight models seen in other regions. This does not necessitate an all-powerful regulator, but rather a politically feasible, phased transfer of specific sovereign functions. The African Civil Aviation Commission should be granted powers for independent compliance audits, mandated to publish an annual African Aviation Environmental Report to transparently rank member state compliance and performance, have a dispute resolution mechanism to allow it to issue binding decisions in cases of non-compliance with the Protocol as well as an appeals process to a designated African Union judicial body.